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EDITORIAL · REDAKSIONEEL

DIAGNOSTIC X-RAYS, THE PELVIS AND THE FOETUS

In 1956 Stewart *et al.*[1] suggested, in a preliminary report, that if pregnant women were submitted to a diagnostic exposure of X-rays, they might have increased chances of giving birth to children who would subsequently develop leukaemia. Widespread publicity was inevitable for this claim, especially in the lay press, even though the release of the report was regarded in many circles as premature, if not unwarranted.

In this atomic age we are extremely sensitive to suggestions linking radiation with somatic and genetic dangers. It was therefore to be expected that methods of shielding the foetus from irradiation would be evolved for antenatal examinations. Appelby *et al.*[2] recently described a method for measuring the transverse diameter of the brim and the sagittal diameters of the birth canal at all levels. Elsewhere in this issue,[3] Dr. Harris Jackson (of Johannesburg) describes a similar method of protection, based on a different mensuration principle which enables the radiologist to measure the transverse diameter of the inlet and the mid-cavity. (In most cases, outlet measurements can be determined clinically). Jackson's technique is simpler, quicker and more accurate.

There are other simple manoeuvres which may protect the foetus from the (theoretical) risk of exposure to radiation. A breech can,

1. Stewart, A. *et al.* (1956): Lancet, **2,** 447.
2. Appelby, A. *et al.* (1958): Brit. J. Radiol., **31,** 267.
3. Jackson, H. (1958): This Journal, **4,** 541.

DIAGNOSTIESE X-STRALE, DIE BEKKEN EN DIE FETUS

In 1956 het Stewart *et al.*[1] in 'n voorlopige verslag die bewering gedoen dat as swanger vrouens vir diagnostiese doeleindes aan X-straal-beligting blootgestel word, daar 'n verhoogde moontlikheid bestaan dat hulle die lewe sal skenk aan kinders wat later leukemie kan ontwikkel. Wydverspreide publisiteit vir hierdie aanspraak—veral in die lekepers—was onvermydelik, ondanks die feit dat die vrystelling van die verslag in baie kringe as voorbarig, en miskien selfs as ongeoorloof beskou is.

In hierdie atoomeeu is ons buitengewoon gevoelig vir enige suggestie dat bestraling somatiese of genetiese gevare kan meebring. Soos dan ook verwag kon word, is metodes ontwikkel om die fetus teen bestraling tydens voorgeboortelike ondersoeke te beskerm. 'n Metode om die dwars middellyn van die rand en die sagittale middellyne van die geboortekanaal op alle peile te meet, is onlangs deur Appelby *et al.*[2] beskryf. Elders in hierdie uitgawe[3] beskryf dr. Harris Jackson (van Johannesburg) 'n dergelike beskermingsmetode, gebaseer op 'n ander metingsbeginsel, wat die radioloog in staat stel om die dwars middellyn van die ingang en die middelholte te meet. (In die meeste gevalle kan die uitgangsmate klinies vasgestel word).

Daar is ander eenvoudige maniere om die fetus teen die (teoretiese) gevaar van blootstel-

1. Stewart, A. *et al.* (1956): Lancet, **2,** 447.
2. Appelby, A. *et al.* (1958): Brit. J. Radiol., **31,** 267.
3. Jackson, H. (1958): Hierdie Tydskrif, **4,** bl. 541.

for example, be converted into a vertex presentation and the presenting part can, in certain circumstances, be elevated. Jackson's shield inevitably means the application of a lower dose and his technique also ensures complete protection of the maternal ovaries.

The method developed by Appelby *et al.* and by Jackson will very likely be modified in the future. Radiologists can have their choice, but the principle of shielding the foetus (which is simply an extension of well-known radiographic practice) has probably come to stay.

It is necessary to emphasize that this shielding has been devised to prevent risks that are not only theoretical but may also not even, in reality, exist. There is therefore no justification for depriving a patient (when the circumstances warrant it) of a full radiological pelvimetric examination. Short of trial labour, radiological pelvimetry is the most accurate means of determining the obstetrical adequacy of the birth canal; and trial labour is not without its real dangers.

As we have indicated, the alleged risks that these methods have been designed to minimize are genetic and somatic. The genetic risk is that of producing mutations which may affect future generations. It has not been proved that these occur in Man, but it can reasonably be assumed from animal experiments and on theoretical grounds. Whether, however, such mutations will, *in the long run,* prove to be deleterious, is still in the realm of speculation. It has been well established experimentally with high doses and very highly pure-bred strains of animals, i.e. homozygous populations, that radiation-induced mutations are generally unfavourable. There is, however, evidence that in heterozygous strains (as in the diversified composition of Man) favourable mutations occur.[4] Nevertheless, it would seem undesirable, in the present state of our knowledge, to interfere with the spontaneous rate of radiation-induced mutations more than is absolutely necessary. If, indeed, evolution proceeds to an important extent by mutations which are induced by radiations reaching this planet from outer space, it may well be wise to leave Nature unassisted.

Concern about the somatic hazard rests on an even less secure foundation. Neither theory nor experiment, and still less clinical observation, provide any justifiable suspicion that

4. Annotation (1957): The New Scientist, 25 July, p. 7.
See also Wallace, B. (1957): Proc. Nat. Acad. Sci., **43**, 404.

ling aan bestraling te beskerm. 'n Stuitligging kan, byvoorbeeld, in 'n kruinligging verander word, en die liggingsdeel kan, in sekere omstandighede, verhoog word. Jackson se skild beteken onvermydelik die aanwending van 'n laer dosis, en sy tegniek verseker ook algehele beskerming vir die eierstokke van die moeder.

Die metode wat deur Appelby *et al.* en deur Jackson ontwikkel is, sal heel waarskynlik in die toekoms gewysig word. Radioloë sal kan kies, maar die beginsel om die fetus te beskerm (wat eenvoudig 'n uitbreiding van die bekende radiografiese praktyk is) is waarskynlik nou vir altyd by ons.

Dit is nodig om klem daarop te lê dat hierdie skerm-metode ontwerp is om risiko's wat bloot teoreties is en in werklikheid miskien glad nie bestaan nie, te voorkom. Daar is derhalwe hoegenaamd geen noodsaaklikheid om 'n pasiënt (as die omstandighede dit vereis) 'n volledige radiologiese bekkingmeting-ondersoek te ontsê nie. Met uitsondering van 'n proefbevalling is radiologiese bekkenmeting die mees akkurate manier om die verloskundige doeltreffendheid van die geboortekanaal vas te stel; en proefbevalling is nie sonder sy wesenlike gevare nie.

Soos ons aangedui het, is die beweerde gevare wat hierdie metodes ontwerp is om te bestry, van 'n genetiese en somatiese aard. Die genetiese gevaar is dat mutasies geproduseer sal word wat toekomstige geslagte kan affekteer. Daar is nog nie bewys dat sulke mutasies by die mens voorkom nie, maar aan die hand van die proefnemings wat met diere gedoen is, en op teoretiese gronde, kan wel aangeneem word dat hulle nie onmoontlik is nie. Of sodanige mutasies *op die lange duur* egter skadelik sal wees, is iets waaroor allerhande bespiegelinge gedoen kan word. Proefondervindelik is daar reeds deeglik bewys dat met hoë dosisse en besonder opreggeteelde diersoorte, d.w.s. homosigotiese populasies, bestraling inderdaad mutasies teweeggebring het wat oor die algemeen ongunstig was. Daar is egter ook bewys dat met heterosigotiese soorte (soos in die uiteenlopende samestelling van die mens) gunstige mutasies kan plaasvind.[4] Nietemin, en met die oog op die kennis waaroor ons op die oomblik beskik, skyn dit onwenslik te wees om die spontane mutasies wat deur bestraling teweeggebring word, in 'n groter mate te versteur as wat absoluut noodsaaklik is. Indien dit waar is dat evolusie in 'n belangrike mate bevorder word deur mutasies teweeggebring

4. Aantekening (1957): The New Scientist, Julie 25, bl. 7.
Sien ook Wallace, B. (1957): Proc. Nat. Acad. Sci., **43**, 404.

diagnostic doses of X-rays may damage the patient. The only clinical work[1] that has alleged such a harmful possibility appears to have been inadequately controlled and has certainly been very thoroughly criticized.[5-10] Lamerton,[11] e.g. is of the view that the claim should be treated 'with considerable reserve.'

Nevertheless, we live in an atmosphere of fear of irradiation and until this fear can be allayed or dispelled by sound scientific evidence, we are bound not to expose any patient unnecessarily. To this end, an adequate examination with a limited radiation dose, is a forward step. Fainsinger,[12] *inter alios,* has already indicated useful and practical ways in which the quantity of radiation required for diagnostic procedures can be substantially reduced without sacrificing the quality of the radiographic result. The method now advocated by Jackson is an important addition to the techniques whereby all the information we seek can be obtained without requiring the patient to undergo any of the hypothetical risks which have been postulated.

In the light of our present knowledge, a conservative attitude is commendable but there is certainly no reason why such an attitude should interfere with the performance of a necessary examination. When a full pelvic examination is indicated, this must be done, in the interests of the mother and the child, notwithstanding the hypothetical dangers which have raised such wide-spread fears in the lay mind.

deur strale wat hierdie planeet uit die buiteruimtes bereik, sal dit miskien verstandig wees om geen hulp aan die natuur te probeer verleen nie.

Die besorgdheid oor die somatiese gevaar berus op 'n selfs wankelender fondament. Nòg teorie nòg eksperimente of enige kliniese waarnemings het geregverdige agterdog laat ontstaan dat diagnostiese dosisse X-strale skadelik vir die pasiënt is. Dit skyn asof die enigste kliniese werk[1] waarop die bewering in verband met moontlik nadelige gevolge gegrond is, ondoelmatig gekontroleer is, en dit is dan ook 'n feit dat hierdie werk baie skerp gekritiseer is.[5—10] Lamerton,[11] byvoorbeeld, is die mening toegedaan dat die aanspraak ‚met aansienlike voorbehoude' bejeën moet word.

Nietemin lewe ons in 'n atmosfeer van bestralingsvrees, en tot tyd en wyl hierdie vrees deur gesonde wetenskaplike bewyse verminder of verdryf kan word, is dit ons plig om geen pasiënt onnodig bloot te stel nie. Met hierdie doel voor oë is 'n doeltreffende ondersoek met 'n beperkte bestralingsdosis 'n voorwaartse stap. Fainsinger[12] het onder meer reeds nuttige en praktiese maniere aangedui om die hoeveelheid bestraling wat vir diagnostiese prosedures nodig is, aansienlik te verminder sonder om afbreuk aan die kwaliteit van die radiografiese resultaat te doen. Die metode wat nou deur Jackson aan die hand gedoen word, is 'n belangrike toevoegsel tot die tegniek in gevolge waarvan al die verlangde inligting verkry van word sonder om van die pasiënt te verlang om haar bloot te stel aan enigeen van die hipotetiese gepostuleerde gevare.

In die lig van ons huidige kennis is 'n konserwatiewe houding aanbevelenswaardig, maar daar is beslis geen rede waarom hierdie houding die uitvoering van 'n noodsaaklike ondersoek in die wiele hoef te ry nie. Wanneer 'n volledige bekkenondersoek aangedui word, moet dit uitgevoer word in die belang van sowel die moeder as die kind, ondanks die hipotetiese gevare wat hierdie wydverspreide vrees in die gedagtes van die leek opgetower het.

PELVIMETRY: A LOW IRRADIATION TECHNIQUE

FOR THE TRANSVERSE MEASUREMENTS

HARRIS JACKSON, L.R.C.P., M.R.C.S., D.M.R.
Johannesburg

Thom's view of the pelvic brim gives the most accurate picture of its shape, but many radiologists and obstetricians prefer Chassar Moir's view because it involves less foetal irradiation, while still giving an acceptable picture of the brim.

These views are taken primarily for the measurement of the transverse diameters of the brim and of the mid-cavity. The diameters can be obtained more exactly by means of Schwarz' orthometric pelvimetry,[1] in which the examination is performed in the Chassar

5. Rabinowitch, J. (1956): Lancet, **2,** 1261.
6. Rabinowitch, J. (1957): Lancet, **1,** 219.
7. Reid, F. (1957): Lancet, **1,** 428.
8. Sonnenblick, B. P. (1957): Lancet, **1,** 1197.
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11. Lamerton, L. F. (1958): Brit. J. Radiol., **31,** 229.
12. Fainsinger, M. H. (1957): This Journal, **3,** 422.

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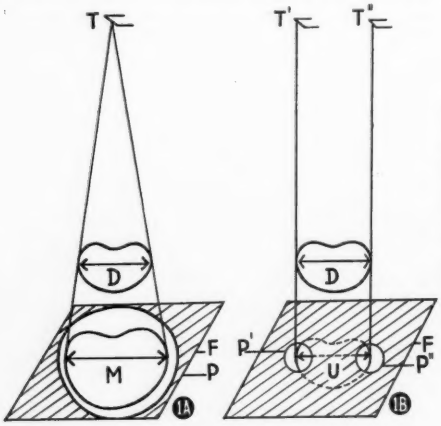
12. Fainsinger, M. H. (1957): Hierdie Tydskrif, **3,** 422.

Moir position, and the measurements are made by the scanning method. Schwarz' method may be modified to reduce foetal irradiation.

Fig. 1 illustrates the principle of the scanning method. A small error occurs when the actual diameter differs from the tube shift, but in the important clinical range it is insignificant, as can be seen from Table 1 and Fig. 2 (which can also be used to correct the error).



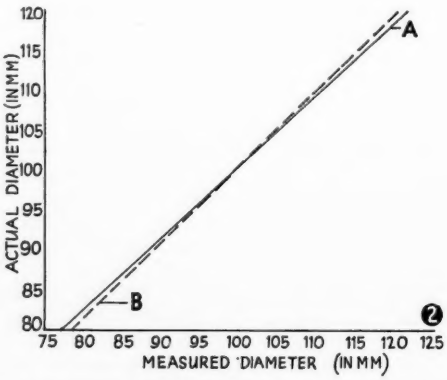


Fig. 1*a*. The magnification obtained with conventional radiography in which a single exposure is made.
Fig. 1*b*. The absence of magnification with the scanning method in which 2 exposures are made with a tube shift equal to the diameter to be measured.
T: Tube focus.
T', T": Position of foci in the 2 shift positions.
D: Diameter to be measured.
U: Unmagnified image.
M: Magnified image.
P: Radiograph.
F: Film.

Fig. 2. A: Transverse diameter of inlet.
B: Bispinous diameter.

TABLE 1: THE RELATIONSHIP OF ACTUAL TO MEASURED PELVIC DIAMETERS*

Actual Diameter (mm.)	*Transverse Diameter of Brim*		*Bispinous Diameter*	
	Error	*Measured*	*Error*	*Measured*
80	−2·5	77·5	−1·2	78·8
85	−1·9	83·1	−0·9	84·1
90	−1·2	88·8	−0·6	89·4
95	−0·6	94·4	−0·3	94·7
100	0	100·0	0	100·0
105	+0·6	105·6	+0·3	105·3
110	+1·2	111·2	+0·6	110·6
115	+1·9	116·9	+0·9	115·9
120	+2·5	122·5	+1·2	121·2

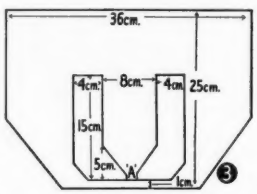
* Modified from Schwarz.[1]

The fields can be kept small either by an adjustable multiple-leaf diaphragm or by a lead or lead-rubber mask (Figs. 3, 4). The small fields eliminate the need for a grid and, although the resulting radiograph lacks contrast, the exposure is about half that required with a grid for small fields. If a grid is used, table-top technique is preferable to Bucky technique because in the latter some movement of the tray almost invariably takes place with re-loading the Bucky spring.

Two fields each about 4 × 15 cm., measured on the patient's abdomen, appear to give an adequate picture of the shape of the brim (Figs. 5A–5C). If only measurements are required, e.g. if the shape of the brim is known from previous examinations, the fields can be made smaller.

TECHNIQUE

The patient lies on her back on a bolster placed to exaggerate the lumbar lordosis. The but-



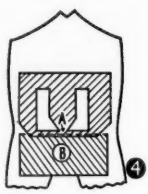


Fig. 3. Pattern for mask, made of 1/16 inch lead, or of lead-rubber.
Fig. 4. The mask in position on the patient's abdomen, with the point 'A' on the symphysis pubis.
'B' is a rectangular mask placed below the special one.

tocks rest on a 12 × 10 inch cassette placed transversely and centred to the middle of the inlet. If a lead mask is used, it is placed as in Fig. 4 and moulded to the abdomen, with a second rectangular mask covering its lower margin (Fig. 4). A small cone is employed. The first exposure is centred 5 cm. to one side of the mid-line, about 7 cm. superior to the symphysis pubis, while the opposite field is covered with lead. The second exposure is made 5 cm. to the other side. It is essential that no movement of the patient or the film takes place between the exposures. The technique is simpler with an adjustable diaphragm, when rectangular fields 4 × 15 cm. are exposed, each 5 cm. to one side of the mid-line.

If the patient is not sufficiently lordotic, the ischial spines will not be demonstrated, but the symmetry and the maximum transverse diameters of the mid-plane and of the brim can be measured. The tube may be tilted caudally to visualize the ischial spines without interfering with the measurements.

The measurements are made directly, i.e. without a distortion ruler.

The following factors have been used with high speed films and screens: At 100 F.F.D. (focus film distance), 90 K.V.P. with 2 mm. Al filtration and 25 M.A.S.

DISCUSSION

The foetal volume dose is a small fraction of that of Thom's view (conservatively estimated at less than 1/50) or of a well-coned Chassar Moir view (estimated at less than 1/8). In

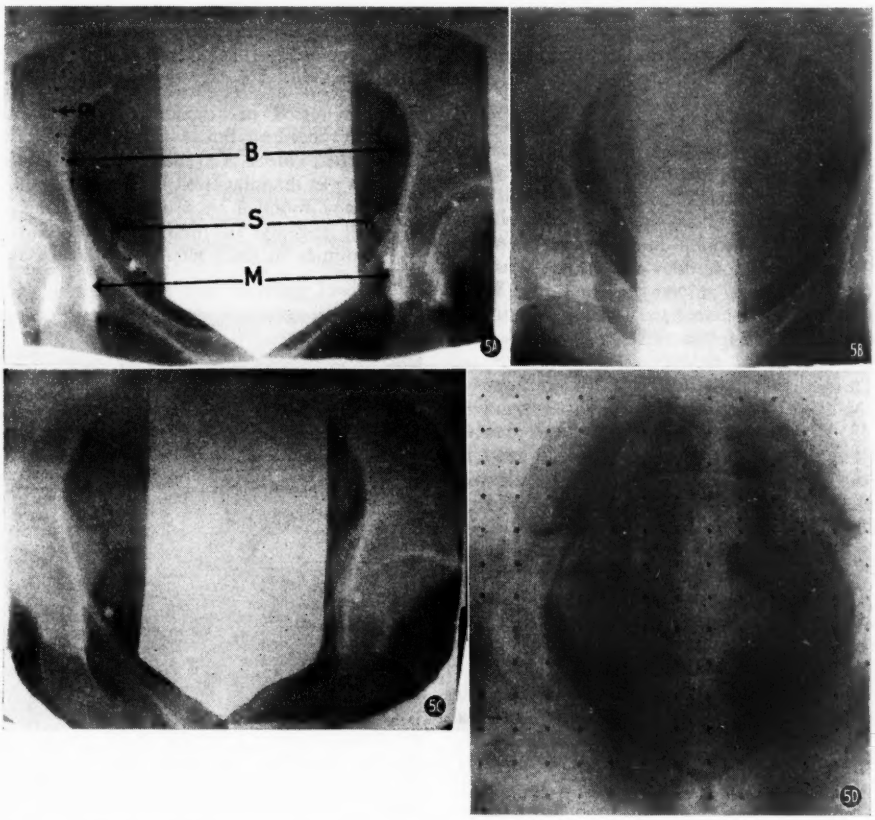


Fig. 5*a*. To illustrate the maximum transverse diameter of the brim (B), of the mid-cavity (M), and the bi-spinous diameter (S).
Fig. 5*b*. Radiograph taken with the multiple leaf diaphragm.
Fig. 5*c*. Radiograph taken with the lead mask.
Fig. 5*d*. Thom's view of the same case as in Fig. 5c. for comparision. Figs. 5b, 5c, and 5d have been retouched.

the direct beam at a depth of 10 cm. in a water phantom, the dose measured with a 250 milliroentgen ionization chamber was 40 milliroentgens, and outside the direct beam no reading could be obtained. This is much the same as Lindsay's figures obtained with a similar method he has briefly described.[2] The dose to the foetus may thus be too small to be measured with this instrument if the examination is performed before the presenting part has entered the brim. The maternal ovaries and, in cephalic presentations, the foetal gonads, receive no direct irradiation.

It seems reasonable to suggest that this method of obtaining the transverse measurements should be employed as the first approach in pelvimetry, and that Thom's view should be reserved for those cases with doubtful measurements in which a more exact assessment of the shape of the brim is required.

OPSOMMING

Die skrywer verstrek 'n beskrywing van 'n aanpassing van Schwarz se metode om die dwars middellyne van die bekkenrand en middelholte te meet om fetus- en moederbestraling tot 'n minimum te beperk.

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AN EARLY INFANT FEEDING FLASK

S. LEVIN, M.B. (RAND), M.R.C.P. (EDIN.), D.C.H.
Johannesburg

'The sucking bottle, a pocket wet nurse'
Forsyth.

It is surprisingly difficult to obtain information on infant feeding practices in earlier times. There is particularly a curious reluctance to note details of artificial feeding. While it is likely that very young infants have been fed by 'bottle' for more than 2,000 years, it would be very difficult to answer the question: 'What were the forms of artificial feeding among the earliest South African settlers, or among the Voortrekkers?'

Langenhoven, for example, in writing his autobiography,[1] notes that he was born in 1873, a premature baby, and that his mother died 5 days after his birth. As a result, he states with tantalizing brevity, 'het hulle met botteltjies gesukkel, met koeimelk en bokmelk en donkiemelk.' He gives no further details.

Inquiry at a number of museums and antique shops has not yielded much information, although the Africana museum in Johannesburg has a small nondescript glass bottle which might conceivably have been used for infant feeding round about 1900.

In the hope of finding an early feeding bottle, a short article on the history of artificial feeding was published in a popular Afrikaans magazine.[2] The article elicited only one relevant inquiry. A woman from Worcester in the Cape Province wrote in to say that she possessed an old feeding bottle which had been in common use when she was a little girl (in the 1880's). She had found it in the attic of her mother-in-law's house. The flask was then forwarded to me. It turned out to be a glass specimen of 8 oz. capacity known as the Alexandra Feeding Bottle (Figs 1, 2). It was named after Queen Alexandra, wife of Edward VII. It was manufactured by S. Maw & Sons, a company founded by George Maw in 1807 and still engaged in producing bottles, teats and dummies in their factory in Barnet, England.

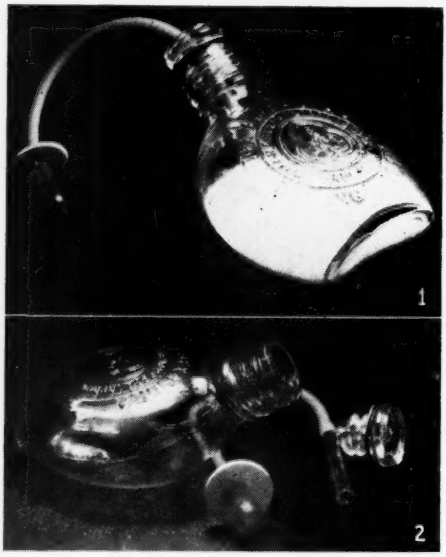

Fig. 1. The Alexandra Feeding Bottle (assembled).
Fig. 2. The Alexandra Feeding Bottle (unassembled).

The bottle looks rather like a whisky flask, standing on a broad base and having a screw neck into which fitted a glass stopper with a central channel. An indiarubber washer made the connexion between bottle and stopper air-tight.

The accessories of this bottle have long since perished, but have been easily reproduced with reasonable accuracy. They consisted of a rubber tube which was threaded through the channel in the glass stopper. The rubber joined on to a glass tube, the tip of which touched the bottom of the bottle, while at the other end of the rubber tube was a conventional teat (usually black in colour) and guard. The milk was thus siphoned out of the bottle by means of sucking on the teat.

How did air enter to relieve the vacuum? A little entered via the teat in the siphon tube, but most of the air made its way into the bottle through the glass stopper, since the rubber in the channel of the stopper did not block it off altogether. If it did block it now and then, the infant sucking on such a bottle must have had a lot of colic.

DISCUSSION

The 19th century was a turning point in the long history of artificial feeding. By the end of the century 3 principles had been established:[3]

1. The realization that artificial feeding of infants had come to stay.
2. The realization that the demand for patent infant foods had also come to stay.
3. The need for a satisfactory feeding bottle.

The glass feeding flask dates from the early part of the 19th century, and evolved in two forms from two sources. All feeding 'bottles' are basically of two types:

(*a*) *The Single-Orifice Form.* These have a single opening at one end through which the infant sucks, and through which the bottle is refilled, the nipple having to be removed for the refilling process. As a general rule, these bottles are vertical, upright in form, although not invariably so. The Alexandra bottle, for example, is 'boat-shaped,' but is nevertheless basically a single-opening erect bottle. Before the use of glass in this form, such bottles were made of wood[4] (medieval times), later of pewter, then of glass with a pewter top and teat, and finally all glass.

(*b*) *The Dual-Orifice Form.* This is the oldest type of vessel known to us, and has evolved principally through pottery, cow's horns, pewter, porcelain and glass. It possesses one opening through which the fluid is poured in and another through which the infant sucks. As a general rule it is 'boat-shaped,' although erect glass dual-orifice bottles have existed. Glass boat-shaped bottles first came into use in England about 1840. The sucking hole for the teat was at one end of the flask's extremity, while the other hole, for filling, was not at the other extremity, but at the top of the bottle. This orifice was then stoppered with a cork. A half-century later, the filling orifice was placed at the other extremity of the bottle and covered with a rubber valve, thus giving rise to the no longer familiar boat-shaped bottle. It is falling into disuse because of the difficulty in cleaning it, and in warming it up before feeding.

By the 1870's the erect glass bottle with a single orifice for the teat was coming into prominence, and when it was modified by insertion of the suction tube, it had great popularity, but rapidly declined by the early 1900's, at which time the boat-shaped bottle again came into prominence. This time its openings were at either end of the flask, with a teat on one opening and a rubber valve on the other for dealing with the vacuum produced by the infant's sucking. This is again disappearing, while the single-orifice erect bottle seems to have become established permanently in the form of the 'Evenflo' bottle among the better-off, and the Coca-Cola bottle among the poor.

'. . . the first feeding bottle with the glass tube inside and an indiarubber tube outside was introduced by O'Connel about 1850, who was then living at Bury in Lancashire. He approached Maw's with the idea and the patent, but they tabooed the whole affair, and the firm would not entertain the matter. One of the directors of Maw's was discussing this matter with a Mr. Martin (*Senr.*) who was a foreman in the workshop. The director was surprized by Mr. Martin's producing from the cupboard an old pattern of his own invention on precisely the same principle as the O'Connel with indiarubber tube which he also had submitted to the manager with a similar result.

The prices of O'Connel's feeding bottles when first brought out were 2s. 6d., 5s. and 7s. 6d. each. The sale was in consequence very limited.

About 1858 Maw bought the patent of Tierman's Fountain Feeding Bottle which . . . was the first feeding bottle with tubes and a valve to prevent the return of the milk into the bottle. This was considered a great improvement on the O'Connel bottle and, in

1861, when the feeding bottle department was reorganized, 1s. and 1s. 6d. feeding bottles were introduced. This gave a great impetus to the sale and, afterwards, a demand sprang up for 6d. bottles, which was met. Thousands of gross were sold to the U.S.A., Holland and other countries.'[5]

In the U.S.A. the idea of the long sucking tube appears to have occurred independently to an inventor in 1864. Patent 42427 of that year states:

'This invention consists in the employment or use of a flexible tube to form a connexion between the spout and the body or reservoir of a nursing bottle in such a manner that a baby nursing from such a bottle can take the reservoir in its arms and the spout in the mouth and while sucking move its head in either direction without losing the spout, or change the position of the reservoir without pushing the spout up its mouth or drawing it out therefrom. My bottle, when once properly adjusted, may be left in the hands of the baby.'[6]

The idea of the siphon tube caught on rapidly on both sides of the Atlantic and there were numerous modifications for patents (some tubes were made of lead!) until about 1900, after which this type of bottle rapidly fell into disfavour, being replaced by the boat-shaped vessel with teat and valve.

The Alexandra nursing bottles thus had their heyday in the 1880's and 1890's and the catalogue of the House of Maw for 1913 lists numerous modifications of the basic Alexandra pattern.

Some of the bottles were calibrated in tablespoons (up to 16). One type indicated a tiny glass valve within a constricted area of the glass siphon tube, the function of this valve being to prevent milk sliding down out of the siphon tube back into the bottle when the baby ceased drawing on the teat. It was also possible to get specimens that had a thermometer attached to the glass tube in the bottle. The stoppers for the neck of the bottle were of various materials (not always glass) and colours.

According to Maw's 1913 catalogue, the price of the Alexandra bottle at that time varied from 6d. to 1s. 6d., although some specimens could be had for as little as 2d.

The teats in 1913 were usually black in colour and of all shapes and sizes. Prices varied from 5s. to 40s. per gross. When rubber teats were first sold by Maw's *circa* 1851,[5] they cost in the region of 4s. to 9s. a dozen. At this time rubber teats displaced other forms made of such substance as linen, leather and ivory. Apparently rubber teats were first patented in the U.S.A. in 1845, and introduced into England some 5 years later. It would be idle to pretend, however, that the rubber teat is the acme of possible achievement in artificial feeding. In fact, as late as 1928 an American patentee pressed the claim of glass teats to replace the rubber ones which he considered to be unsatisfactory and insanitary.[6]

ADDENDUM ON TEATS

From the subject of teats it is but a short step to that of dummies (soothers, pacifiers), which can be briefly considered here.

Their origin is obscure. In the 18th and early 19th centuries (and possibly for eons earlier), objects were placed in an infant's mouth for two reasons:

1. *To soothe a fretful child.* The substance used was commonly a sponge or linen bag containing a sweet material.

2. *To relieve distress of teething.* The substances frequently used were bony, such as a wolf's tooth mounted in a metal holder, or a 'teething necklace' made of the vertebrae of a viper.[7]

From about 1840 to about 1880 these two procedures became integrated and confused. Maw's catalogue of November 1839, for example, advertises 'gum rings' made of elastic, ivory or bone; and also advertised is 'Maw's Improved Indian Rubber Nipple' at 2s. each. This was probably a solid structure whose function was also that of a 'gum ring' or perhaps that of a dummy. In any event, it seems to have been forgotten about and it not mentioned in the 1869 price list. It reappears in the catalogue of 1882. At this time these rubber structures were called 'soothing pads.' They were flat tongue-like pads, but rudimentary 'modern' teat-like shapes were also in evidence, although without a guard or ring attached.[5] Round about 1900 the guard and ring begin to appear, and Maw's 1913 catalogue gives some prominence to these soothers or pacifiers. Some of these dummies looked rather quaint, perhaps had tiny little bells attached to them. The guard and ring originally consisted of bone, aluminium, india-rubber, or ivory, and in 1913 prices varied from about 1d. to 3s. 6d. each (ivory). A common type was sold to the public at 6d. each. The remarkable feature about so mundane an object as a dummy is its shape (Fig. 3). Amateur Egyptologists will recognize at

once that the shape is the exact reproduction of the ancient Egyptian Symbol of Life. Many of the gods of Egypt are depicted as holding an object in their hand which looks just like a dummy. It is presumed to portray the female sexual organs, and as such becomes the

Fig. 3. The Dummy: Symbol of Life.

Avenue of Life and hence the Symbol of Life. The metaphysically and psychiatrically inclined may like to muse on the strange quirk of fate that has made the dummy the very Symbol of Life itself.

OPSOMMING

Terwyl die geskiedenis van kunsmatige kindervoeding in Europa en selfs in die ou lande wat aan die Midellandse See grens, betreklik goed bekend is, weet ons baie min van hierdie onderwerp vir sover dit Suid-Afrika betref. Ek kon geen verwysings vind na kunsmatige melkvoeding onder die Voortrekkers nie, hoewel meelbol waarskynlik allerweë gebruik is. Langenhoven wat in 1873 gebore is, meld dat hy kunsmatig gevoed is . . . ,hulle het met botteltjies gesukkel, met koeimelk en bokmelk en donkiemelk.' Ek het 'n paar maande gelede 'n onderhoud met mej. Sarah Goldblatt (die Langenhoven-argivaris) gehad, maar kon geen nadere verduideliking van hierdie naakte frase verkry nie.

Navraag wat gedoen is oor 'n artikel in verband met kunsmatige voeding wat in Afrikaanse leketydskrif gepubliseer is, het 'n Alexandra-kinderbottel wat teen die einde van die 19de eeu in gebruik was, aan die lig gebring. Dit is in die tagtigerjare van die vorige eeu in Worcester, Kaapland, gebruik, en die vernaamste kenmerk daarvan was 'n sifonbuis.

Daar is 'n kort opsomming van die ontwikkeling van kinderbottels. Hierdie bottels het aansienlik gewilder geword toe rubberspene 100 jaar gelede ontdek is. Daar is ook 'n paar toepaslike opmerkings oor die ontwikkeling van fopspene.

I am indebted to Mrs. D. W. Hugo, of *Spes Bona*, district Worcester, for sending me her precious feeding bottle.

Thanks are due to Mr. Skinner of Maw's in England for his assistance, and to Mr. E. N. Torry, Maw's representative at Westdene Products, Johannesburg, for showing me the 1913 catalogue.

Mr. S. Chai took the photographs.

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ASPECTS OF INTESTINAL FISTULAE

WILLIAM GIRDWOOD, CH.M. (RAND), F.R.C.S. (ENG.), F.R.C.S. (EDIN.)

Johannesburg

In this field, the surgical and pathological assistance to be gained from the literature is confined to etiological studies[1] and to the routine handling of enterostomy and colostomy. As long as obstruction is absent in intestinal fistulae,[2] a conservative approach is recommended for 2–3 months or even for a year.

Management of large bowel injuries by exteriorization was a principle established during World War II.

The experiences related in this paper are derived from cases used throughout to illustrate general principles in the handling of this type of problem.

CLASSIFICATION OF INTESTINAL FISTULAE

1. *Elective* (*surgeon-made*): Caecostomy, Colostomy, Ileostomy, etc.

2. *As the Result of a Disease Process* (from ulceration, abscess formation or trauma, surgical or other, congenital, etc.):
   - Gastrojejocolic fistula (stomal ulcer);
   - Cholecysto-duodenal fistula (gall stones);
   - Appendicular or pelvic abscess;
   - Diverticular abscess (colon diverticulitis);
   - Meckel's diverticular abscess;
   - Crohn's disease (regional ileitis with abscess);
   - Actinomycosis;
   - Tuberculosis;
   - Amoeboma;
   - Malignant ulceration;
   - Foreign body granuloma and abscess;
   - Localized necrosis of intestine (strangulated hernia);
   - Hydatid disease (often bizarre internal fistulae).

3. *External or Internal Fistulae.*

4. *High or Low Intestinal Fistulae.*

5. *Fistulae with or without Obstruction of the Intestine Distally.*

6. *Degrees of Intestinal Fistulae*:[3]

Granulation-lined soft track;
Fibrous-tissue-lined track;
Mucosal continuity with skin.

The complicated problems arising in cases of intestinal fistulae require a correct assessment in each case.

The cases which follow are presented to cover 4 particular problems and establish certain principles in the handling of these cases:

i. Closure of a small intestinal fistula may be necessary as a life-saving measure.

ii. Soft-tissue-lined granulation tissue fistulous tracks from the small intestine can be treated or established temporarily with safety.

iii. Chronic fibrous-lined or mucosa-presenting fistulae can be closed with certainty and safety.

iv. Opening of small intestine on the surface, i.e. the establishment of an intestinal fistula, may be used as a life-saving measure.

Establishment of these principles may not only be life-saving but also time-saving. The tenets of prolonged conservatism, of stage operations such as short-circuiting away from the fistula, and of avoidance of the area of the fistula are here condemned as outmoded and exceptional.

I. CLOSURE OF FISTULAE

Case 1. A young woman was shot through the abdomen by an irate husband. Her abdomen was explored. Five days later a yellow-green, excoriating fluid was escaping from the laparotomy wound and shortly after this obvious faeces was mixed with the discharge. Within 2–3 days she was shocked from loss of fluids and peritonitis. She was then referred to the writer.

The fluid and electrolyte balance was restored. Amounts of 5,000–6,000 c.c. of fluid loss from the small intestinal fistula needed replacement and, at the end of 10 days, her condition was re-assessed.

The skin was becoming grossly excoriated, the veins were becoming a major problem and further prolonged intravenous medication increasingly difficult. A polythene tube was inserted through the femoral vein via the saphenous at the groin into the iliac vein and the inferior vena cava. When the urinary output, blood pressure and blood chemistry were satisfactory, operation was performed with the full armentarium available, e.g. blood transfusions and Levophed.

On opening the previous laparotomy wound a large hole in the pelvic colon was seen (Fig. 1). The colon in this region was mobilized and the perforation exteriorized through the paramedian incision. The pelvic colon was contracted and inflamed and was more easily mobilized through this incision than it would have been laterally, but drainage was established through the left iliac fossa with light packing of the oozing left side.

The small intestinal fistula was traced under the omental pancake between loops of moderately dilated, friable small intestine, and the perforation was closed. Soggy intestinal wall took silk sutures unhappily, but a catheter was inserted through a stab incision through omentum down to the suspect closure, tethering the affected bowel near the point of exit of the catheter.

The post-operative course was very satisfactory. A leak of small intestinal contents occurred after 4 days but after the fifth day, when the bowels worked through the colostomy, the abdomen softened. The tethering stitch holding the catheter was cut about the eighth day. It fell out the following day and closure of the small intestinal fistula was complete by the tenth post-operative day.

The subsequent handling of the patient was directed towards the pelvic colostomy, its partial spill-over in the left iliac fossa, the general building up of the patient's depleted protein and nutritional state, the presence of the bullet wedged in the side of the second lumbar vertebra, the problems of a septic thrombophlebitis and streptomycin deafness. The colostomy and the lateral fistula were closed without difficulty. The patient is now fit and well and returned to her doting husband.

Case 2. A Native Shangaan, aged 21 years, was admitted to a mine hospital on 5 May 1957. His doctor wrote:

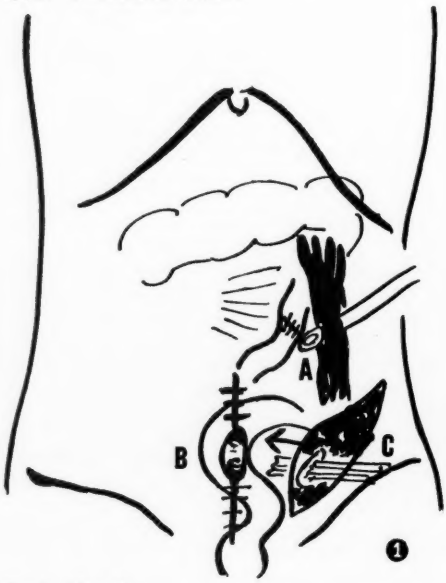


Fig. 1. (Case 1).
A: Small bowel sutured and catheter drain through omentum.
B: Large bowel perforation exteriorized.
C: Infected left iliac fossa packed and drained.

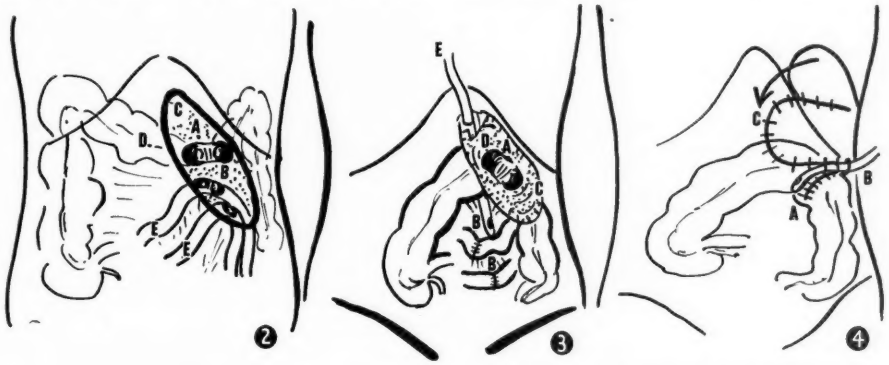
'After a car accident on 4 May there was generalized guarding and tenderness of the abdomen and free fluid was present on clinical examination. Blood pressure, 135/80 mm. Hg. After catheterization the patient stated that he felt better and refused operation. He was treated with intravenous therapy and gastro-duodenal suction.

On 6 May he underwent an operation for a ruptured spleen. On 13 May intestinal obstruction developed; it subsided on an intravenous drip and suction. On 16 May a large amount of pus was evacuated through the left subcostal incision. The wound continued to discharge profusely and there was fairly marked skin excoriation. A pancreatic fistula was suspected. On 28 May, at operation, the fistula was found to be arising from the stomach and an attempt was made to repair it.

On 2 June the fistula reappeared. On 4 June a gastrostomy tube was inserted at the site of the fistula. Thereafter small fistulae reappeared around the gastrostomy tube and attemps at closure were unsuccessful.

The blood urea started rising after the operation on 6 May and on 15 May it was 328 mg. per 100 c.c. He has also developed a bedsore.'

He was seen by the author on 21 June 1957, when he was 'rather' sick. No subcutaneous tissue was present anywhere on his body. All the visible veins were thrombosed or in spasm



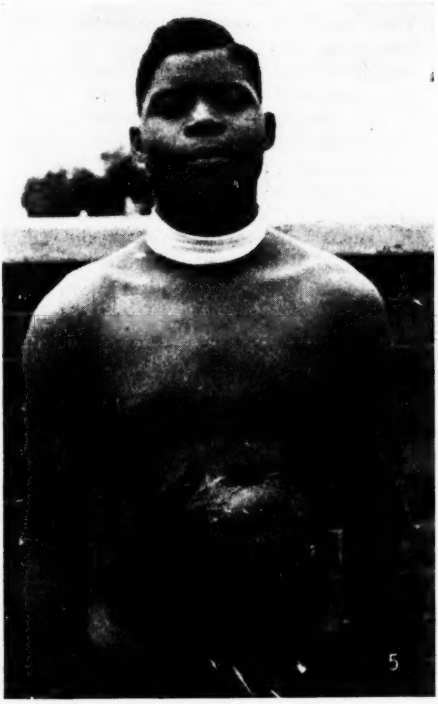


Fig. 2 (Case 2). Large defect (A) in the left hypochondrium, containing healing fistula from the stomach communicating with the subphrenic space and two colon openings (colon (B)). Small intestinal fistulae (small bowel (C)).

Fig. 3 (Case 2). Colostomy and colon (D) exteriorized to fill defect (C) completely. Small intestinal fistulae closed and catheter (E) passed through transverse mescolon and ligamentum teres to area of suture of bowel.

Fig. 4 (Case 2). Plastic Repair of Abdominal Wall Defect and Colostomy.
A: Colostomy closed after resection of prolapse.
B: Catheter drain through omentum.
C: Large rotation skin flap to close defect.

Fig. 5. Photograph of Patient (Case 2).

or had already been used for previous cut-downs. There was a large abdominal wall defect in the left hypochondrium (Fig. 2), in the centre of which there were 5 bowel openings; 3 were pouring small intestinal fluid, cascading from one opening into the other (recession and projection coinciding with the peristaltic waves of the small bowel); 2 of the openings were apparently from the colon.

The confusing nature of the fistulae was not helped by the X-ray report which stated:

'The barium meal was not successful. I cannot reconcile the appearances seen. There is a large, well-defined accumulation of air in the left hypochondrium under the diaphragm. Barium enters the fundus of the stomach readily, but the antrum

could not be made to fill. A small quantity of barium entered the "air pocket." Up to 2 hours no signficant amount of barium enters the small bowel.'

The gastrostomy appeared to be closing off from the surface deficiency. There was also a communication between the stomach and an air pocket under the diaphragm. This subsequently must have healed during the period of 'nothing by mouth' and intravenous alimentation.

The method of venous catheterization through the saphenous vein into the inferior vena cava was used, and from admission *in extremis* until operation on 16 July 1957 he received 5,000–6,000 c.c. a day of Travamine, Balfec or blood, until the urinary output, blood urea, haemoglobin, sodium, potassium and chloride levels were normal.

Operation was designed (Fig. 3) to isolate the fistulae, to close the small bowel openings and to drain these through omentum. In this patient the transverse mesocolon and the ligamentum teres were used.

The colon and its perforations were exteriorized so as to fill the large defect in the left hypochondrium. Because of the danger of evisceration from the large abdominal defect, Elastoplast was used to support the abdomen, leaving just the opening of the colostomy free for drainage.

After operation the patient no longer leaked small bowel contents and the colostomy worked slightly after the fourth day. However, for 11 days 1,000–1,500 c.c. of bright green contents were aspirated through the gastric tube daily, indicating a high intestinal obstruction. The catheter down to small bowel (which had been resected and sutured) was removed at 11 days, when the Elastoplast was removed. The removal of the Elastoplast was associated with immediate diminution of the gastric aspirates and relief of the obstruction. Thereafter the patient improved and was sent to his mine for 3 months. He put on weight and improved so much that he was quite unrecognizable on his return. The colostomy was now prolapsed and excision and closure were done recently.

The large fibrous-lined defect in the left hypochondrium, after separation of colon and closure of the colostomy, which now lay beneath it at operation, was closed (Fig. 4) firstly, by using some omentum and ligamentum teres, and then rotating a large skin flap over it and skin grafting with a Thiersch graft the area from which it came. A drain was placed at the inferior edge under the flap down to the closed colostomy.

The boy is now very fit. His abdomen is grossly scarred (Fig. 5) and the skin flap and underlying scar seem to be withstanding the formation of a hernia, which had been expected.

Case 3. This patient had an abscess opened in the right iliac fossa and loin, and thereafter developed a ruptured abdomen and intestinal fistulae through a right pararectal incision (Fig. 6). There were 2 large bowel and 2 small bowel fistulae. He was in a pitiable condition, almost identical to that in Case 2, but there appeared to be blood and mucus in the large gut discharge.

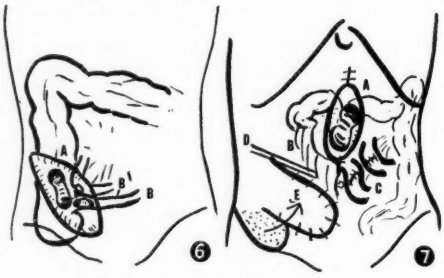


Fig. 6. Case 3.
A: Large defect containing fistulae.
B: Small bowel and fistulae.

Fig. 7. Case 3: Operative Procedures.
The right half of the colon mobilized and exteriorized in the paramedian incision with perforations.
Mesentery of colon through which (C) small bowel sutured was drained by (D) catheter down to closed fistulae.
Large skin rotation flap (E) to close defect (also drained).

A course of emetine was given during the period of preparation for operation, a fever which he had been running settled and the large bowel discharge ceased.

The small bowel fistulae were closed (Fig. 7). A catheter drain was established through the mesentery of the right colon down to the closed small bowel and the right half of the colon was exteriorized anteriorly. The large fibrous-lined abdominal defect on the right side was closed by means of a rotation skin flap and underlying drain.

The patient is at present convalescing for 3 months before the final closure of the colostomy. He is in excellent health.

These 3 cases are evidence that closure of small bowel fistulae as a life-saving measure is an urgent matter. Conservatism in cases such as these is dangerous and unnecessary as long as there has been adequate preparation of the essentials.

These cases also demonstrate the value rather than the disadvantage of operating through the fistulous area and scar, as is also demonstrated in Case 4.

Case 4. A Native was admitted on 22 November 1957. His doctor wrote:

'One and a half months ago I removed a difficult gangrenous appendix. The patient was re-

admitted on 14 October 1957 with acute intestinal obstruction. Laparotomy revealed adhesions and intussusception of the lower ileum and caecum into the rest of the caecum. I could not get this undone. On attempting to undo it, I tore the caecum slightly. I excised most of the twisted adherent ileum and made an ileostomy (terminal). Then I invaginated the stump and the torn portion of the caecum. Specialist surgical treatment is necessary.'

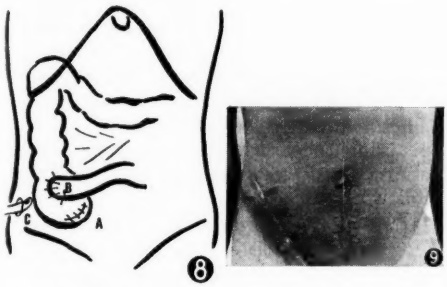


Fig. 8. Case 4: Anastomosis of Terminal Ileostomy (B) to Ascending Colon.
A: Old invaginated portion of caecum.
B: Terminal ileostomy anastomosed.
C: Drainage down to anastomosis.
Fig. 9. Photograph of Case 4.

The patient was relatively easily prepared for operation. The ileostomy was dissected free from scar and mobilized. After some dissection, the ascending colon was discovered with invaginated lower pole. An anastomosis was done above this (Fig. 8) and the abdominal wall closed with separate drainage. His wound has healed by first intention and the patient is now fit and well (Fig. 9).

II. SOFT TISSUE-LINED GRANULATION FISTULOUS TRACKS

When these are from small intestine they can be treated or established temporarily with safety. It is quite obvious that most cases of small bowel resection or closure will heal without leak, but this overlooks the occasional presence of soggy, oedematous, fibrinous, infiltrated tissues, which could allow a leak. Prevention of a dangerous leak and the establishment of early healing of a fistula, if it develops, are essential when dealing with small bowel lesions. Once the principles involved in handling, establishing and controlled healing of such tracks are understood, small bowel lesions are no longer the hazard so often accepted in these cases.

Case 5. A young European male aged 24 had suffered for 14 months from a watery, excoriative fistula following a septic appendicitis and operation. The fistula was mucosa-lined, and with a fibrous wall.

At operation all scar was removed, the caecum closed and allowed to drop down away from the closed wound and a separate tortuous catheter drain was taken through new soft tissues. The suggestion of a leak occurred for a week but then complete healing followed, on removal of the catheter on the seventh day.

Such cases are common. Closure of caecostomy tracks are usual if the track is long and there is no obstruction distally.

Case 6. Captain C., aged 52, developed a closed loop obstruction after a posterior gastrectomy for duodenal ulcer. A herniation of small intestine occurred through the opening in the transverse mesocolon.

At operation (Fig. 10) performed for the relief of this condition, it was found that pressure from the edge of the thickened mesocolon had caused pressure necrosis just short of rupture. The obstruction was relieved by widening of the mesocolon hole. The defect was dealt with and the area of necrosis of small bowel was excised and closed.

A catheter was passed into the small bowel down past the suture line, and with a hole in the catheter on either side of the suture line. The catheter was passed through omentum on its way to the exterior and a catgut purse-string suture used to attach the bowel wall about the catheter through omentum to peritoneum at the point of emergence.

The post-operative drainage from the catheter acted as a Wangensteen deflation. A 'soft' abdomen indicated sealing off and after winds had been passed followed by bowel action in 4–5 days, the catheter stitch was cut. The catheter became free and was removed on the eighth day, with complete healing and cessation of drainage shortly thereafter.

Case 7. A European male aged 49 presented with gross bowel bleeding and diarrhoea requiring 6 pints of blood in preparation for laparotomy.

In the pelvis a thickened inflamed portion of small intestine, about 6 inches long, with large glands in the mesentery draining the area, was resected. Large bleeding vessels were found on the inflamed ulcerated mucosal surface, on opening the bowel at this site. The diagnosis of regional ileitis was made and confirmed later by histological study.

After resection (Fig. 11), in view of the suspect nature of what appeared to be healthy bowel, but which might be unhealthy for suture, and because the patient was known to be highly nervous and not the best type for prolonged gastric intubation, a catheter was used in the same manner as in Case 6. It was passed through an independent stab through omentum into small intestine above the anastomosis and then through the anastomosis (to drain both above and below) and tethering the small bowel through omentum to peritoneum.

The post-operative course was very satisfactory. The abdomen became 'soft' within 48 hours, the catheter drained, flatus was passed

day. The catheter stitch was cut on the seventh day and it was removed on the eighth with complete healing within the next 4 days. below, followed by a bowel action on the fifth

The use of a soft granulation-lined fistulous track in the case of the large bowel is not advisable except when the contents are watery, as in the caecum, and in certain cases of gaseous transverse colon dilatations.

Case 8. A Native aged 41 was admitted with notes stating that, following a fall of rock, he sustained fractures of the transverse processes of the lumbar 3 and 4 on the left side. His abdomen became increasingly distended and resistant with increasing dyspnoea and elevation of the diaphragm. There was no relief with gastric suction. X-rays showed gross distension.

Fig. 10. Case 6.
A: Herniation of small bowel through hole in transverse mesocolon following a posterior Polya gastrectomy.
B: Dilated closed-loop obstruction.
C: 'Unhealthy' closure of small bowel drained by
D: Catheter passing through the sutured area and out through omentum.
E: Omentum.

Fig. 11. Case 7.
A: Area of small bowel bleeding (Crohn's disease.)
B: Resection and sutures.
C: Catheter drainage through
D: Omentum and into bowel and past line of sutures.

Laparotomy was performed and the grossly dilated large bowel was deflated by a catheter, after attempts to do so with a flatus tube had been unsuccessful. There was bruising of the mesentery and the loin, but no other lesion in the peritoneal cavity.

The catheter was taken through omentum and bowel, tacked to peritoneum as in the handling of the previous cases and then through a separate stab drain.

Post-operatively breathing was less laboured, the abdomen remained less distended and, when flatus and stools were passed, the tube was removed. Healing took place within a few more days without further trouble.

This procedure for the relief of gross distension from ileus in retro-peritoneal injuries and fractured ribs may be very useful in this type of case, which is inclined to develop increasing distension, diminished respiratory reserve, cyanosis and pulmonary collapse. Death has been seen following such an injury. With the timely relief (which can even be done under local anaesthesia, if necessary, or as part of an exploratory examination, if more severe damage is suspected) uninterrupted recovery can be expected without complications.

The ill-advised use of a safety valve on the left side of the colon rather than on the right, by using the usually easily controllable non-obstructive caecostomy, is demonstrated in the following case.

Case 9. A European male aged 50 presented with a fistula into the bladder in a diverticulitis of the colon.

At operation the fistula into the bladder was excised and the bladder closed. The thickened portion of the affected sigmoid colon was resected and an end-to-end anastomosis done. A catheter safety valve was used, employing the lower portion of the descending colon.

Although the anastomosis healed, the patient's track from the catheter fistula remained as an infected track amongst the muscles and the abdominal wall, although the bowels were acting normally. It was necessary to do a transverse colostomy and the distal bowel was thus rested for a matter of 6 weeks. Thereafter there was complete healing of the track and the colostomy was closed. The patient was perfectly well, the fistula having healed completely.

The same principle applies when trying to heal granulation tissue tracks (soft walled, not chronic) associated with fistula-in-ano or injured rectum, or large infected faecal-contaminated abscesses and tracks in high ischio-rectal abscesses.

A gas-passing, minute fistulous track from a diverticular abscess may heal spontaneously after drainage, but sometimes a colostomy may be required to get firm and permanent healing of the track, if resection is not considered necessary.

III. CHRONIC FIBROUS-LINED FISTULOUS TRACKS

These will persist and become lined with mucosa. Excision of the track and resection of all scar and closure of healthy bowel can thereafter be done with safety as long as steps are taken to control leakage, if this occurs, by

draining by catheter down to the area of suture.

Case 10. Sgt. E., aged 45, had a faecal fistula after an acute abdominal episode 7 years before, when he underwent an operation for an abscess. X-rays shows the fistula communicating with small and large bowel (Fig. 12).

At operation (Fig. 13) the sinus tracks were excised and a fibro-muscular communication was discovered between the ileum in the region where a Meckel's diverticulum, if present, would be found, and the pelvic colon. At the base of this structure, towards the small bowel side, another fistula stretched through the abdominal wall to discharge in several tracks on the abdominal skin. The tracks and the affected small bowel were resected as well as the portion of colon receiving the fistula, with primary suture and drainage through omentum. This resulted in healing without leakage.

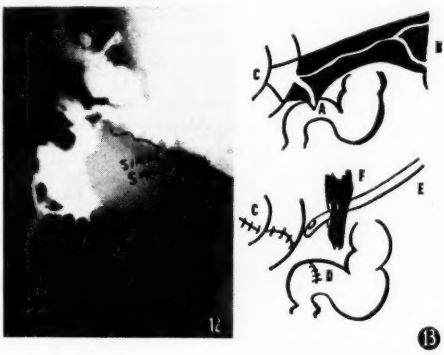


Fig. 12. Case 10.
X-ray showing sinus track connecting with small bowel.

Fig. 13. Case 10.
A: Meckel's diverticulum ulcerated into pelvic colon.
B: Fistulae on abdominal wall.
C: Small intestine and base of Meckel's diverticulum.
D: Pelvic colon sutured.
E: Catheter drainage through
F: Omentum.

The author's personal experiences[4] can record many examples of primary healing on resection and primary anastomosis, and recently such examples include resection of small bowel in a gastrojejunocolic fistula, a melanoma of the small bowel, carcinoma of the jejunum, and tuberculosis with obstruction of the small bowel simulating lymphosarcoma.

In these cases, apart from drainage through omentum down to the suture line, there was no leakage and perhaps drainage was not even necessary; but it is essential to prevent serious fistulation, and this simple procedure performs exactly that function.

Case 11. A Native aged 43 presented with a chronic midline small intestinal fistula of 3 years' duration, with markedly thickened surrounding skin, congested and excoriated with furry, papillomatous thickening about the sinus (Fig. 14). This had occurred after a laparotomy for suspected tuberculous peritonitis. The patient was healthy with good resistance to the disease and without any lung affection. The main disability was the persistent, excoriative fistula.

At operation, after excision of the scar and underlying scarred fistula, 4 loops with 4 openings from the exposed hole could be seen.

Closure transversly with interrupted silk sutures and drainage through omentum away from the central wound resulted in primary healing.

Histological study of the tissues excised (including portions of bowel) failed to show anything other than fibrous tissue granulations, with no evidence of tuberculosis.

IV. SURGEON-MADE SMALL BOWEL FISTULAE IN DESPERATE CASES AS A LIFE-SAVING MEASURE

Case 12. A Xosa aged 20 was operated upon on 31 October 1957 for an 'acute appendicitis without peritonitis.' By 1 November he was acutely ill, suffering from collapse, and was admitted as a possible massive collapse of the lung, excluded by a thoracic surgeon, who ordered gastric suction. Improvement occurred over the following days until 7 November when he was seen by the writer.

Now his condition had suddenly deteriorated (Fig. 15). There was gross distension of the abdomen and surgical emphysema of the abdominal wall, a racing pulse, dyspnoea and a moderately high fever. X-rays showed a gross distension of the small bowel. The area of maximum swelling was in the left hypochondrium.

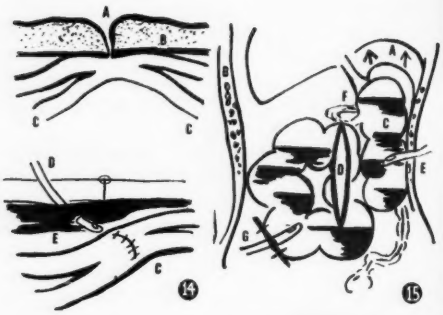
An incision was made transversely in this region and, on entering the peritoneal cavity, there was a loud hiss of air as it escaped.

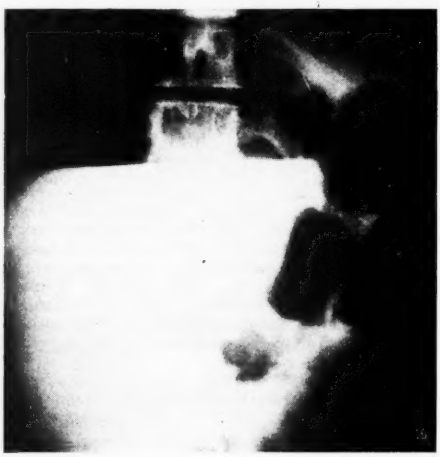
No area of fibrinous exudate was seen, but there was enormous distension of small bowel underlying the incision.

As the patient's condition was serious, only an enterostomy through omentum using a catheter was done, and the areas of surgical emphysema were incised and drained because of the possibility of gas gangrene.

The right iliac fossa was drained. There was no evidence of pus there, and the dehisced paramedian incision closed with tension sutures.

The enterostomy tube and the gastric tube were connected to a suction apparatus post-operatively but soon only the enterostomy tube was required for suction purposes.





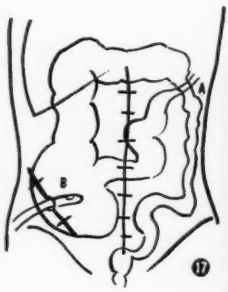


Fig. 14. Case 11.
A: Fistula.
B: Thickened excoriated skin.
C: Loops of small bowel resected from fistula.
D: Catheter.
E: Omentum.

Fig. 15. Case 12.
A: Intra-peritoneal air.
B: Surgical emphysema.
C: Fluid levels in dilated small bowel.
D: Ruptured midline 'Appendicectomy' incision.
E: Catheter enterostomy through omentum.
F: Contracted small bowel at site of volvulus.
G: Caecostomy after correction of volvulus.

Fig. 16. Case 12. Fluid levels associated with intestinal obstruction.

Fig. 17. Case 12.
A: Unwound volvulus.
B: Caecostomy anchoring bowel in normal position.

Fig. 18. Case 12. Patient after operations.

The patient passed wind after about 5 days and shortly after this he had bowel actions and recovered. The enterostomy tube was removed about the ninth day and no further drainage occurred from it after the eleventh day.

There followed a period of good health with normal bowel action and improvement in his condition until 5 December 1957, almost a month later, when he complained of colic and distension. X-rays showed gross distension with fluid levels apparently of small bowel and the right half of the colon (Fig. 16). His general condition now was greatly improved as compared with his state when first seen a month earlier.

A generous exposure was necessary to relieve an enormously dilated twisted bowel from a volvulus affecting the base of the small bowel mesentery. The removal of adhesions from the previous enterostomy was necessary and, upon unwinding the volvulus, the caecum was drained and relieved of the enormous distension by a caecostomy which served also to fix the bowel and so prevent recurrence (Fig. 17). The caecostomy was handled as all the other soft-tissue granulation tracks, with healing and complete recovery in a short period (Fig. 18).

It seems obvious that the original condition was that of a volvulus with intestinal obstruction, escape of gas after appendicectomy either at that site or somewhere else, and the complications of appendicectomy, surgical emphysema, intraperitoneal gas and ruptured abdomen only served to confuse the picture. The temporary enterostomy served a purpose at a time of extreme emergency and relieved the obstruction from the volvulus for as long as one month.

Case 13. A male aged 42 had a splenectomy for acholuric jaundice. The very large adherent spleen was removed without much difficulty; 24 hours later a slight coffee-ground vomit was handled by insertion of a gastric tube. He settled down, although there was now surgical emphysema of the abdominal wall and a distended abdomen. A fever deve-

loped and then rigors. Intense diarrhoea followed, but distension persisted and on X-ray distended small bowel loops were visible with fluid levels, although there was no relief by gastric suction.

Three years before the patient had typhoid fever. Amoebiasis could not be excluded as a cause of the diarrhoea.

A closed-loop partial obstruction (Fig. 19) appeared to be the cause of the distension, probably from a partial volvulus with intermittent relief and intense diarrhoea.

An ileostomy was performed under local anaesthesia in the right iliac fossa, where markedly distended small bowel loops were present.

Within a few days bowel movement became established again and the ileostomy tube was handled in the usual way, although healing took about 12 days, mainly because, in this case, no omentum was available and a tortuous track for the fistula eventually communicated with the wound in the right iliac fossa.

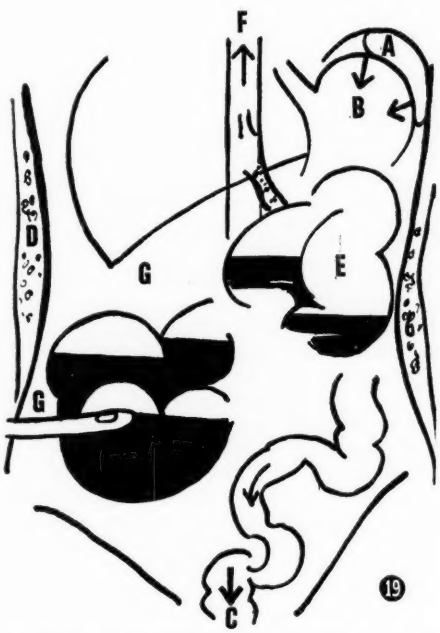


Fig. 19. Case 13. Complications Following Splenectomy.
A: Spleen—removed at operation.
B: Coffee ground vomiting on second post-operative day.
C: Diarrhoea after fifth post-operative day.
D: Surgical emphysema from first post-operative day.
E: Dilated loops of small bowel with fluid levels (partial volvulus).
F: Portal pyaemia with rigors.
G: Catheter enterostomy.

The diagnosis of portal pyaemia (gastric bleeding after operation and later fever and rigors), partial intestinal volvulus, possible amoebiasis or recurrent typhoid infection and surgical emphysema conspired to complicate the picture; but ileostomy relieved the intense colic and distension of the small bowel complication and certainly assisted in the final cure of the patient.

A physician's assistance in this case was greatly appreciated as, apart from the fluid and electrolyte problems, the use of emetine and Chloromycetin and the observance of alterations in the haemotological picture were essential aspects in the treatment of this difficult case.

SUMMARY

In the treatment of intestinal fistulae:

1. Closure of small bowel fistulae may be a life-saving measure.

2. Establishment of an intestinal fistula of small bowel may also save life.

3. Temporary intestinal fistulae can be managed with safety.

4. Small bowel resections and closure of perforations, even in the presence of 'suspect' bowel, can be managed successfully.

5. Operating through scar and the area of the fistulae is quite safe.

6. Prolonged conservatism is dangerous and time-consuming and unnecessary.

OPSOMMING

By die behandeling van ingewandsfistels:

1. Kan sluiting van dundermfistels 'n lewensreddende maatreël wees.

2. Kan die totstandbrenging van 'n ingewandsfistel in die dunderm ook 'n pasiënt se lewe red.

3. Tydelike ingewandsfistels kan met veiligheid beheer word.

4. Klein ingewandsreseksies en sluiting van perforasies, selfs in die aanwesigheid van 'n ‚verdagte' derm, kan met welslae uitgevoer word.

5. 'n Operasie deur litteken en die gebied van die fistels is heeltemal veilig.

6. Langdurige konserwatisme is gevaarlik, tydrowend en onnodig.

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THE MANAGEMENT OF POLIOMYELITIS IN THE UNITED STATES OF AMERICA

OBSERVATIONS AND COMMENTS ON CURRENT METHODS*

CYRIL J. KAPLAN, M.CH., ORTH., (LIVERPOOL), F.R.C.S.
Durban

EPIDEMIOLOGY

The first monograph on poliomyelitis was published by Heine in 1840. At this stage and for many years the disease was literally an infantile paralysis. Heine described it as occurring from 6 months to 3 years of age. The non-paralytic form was first described by Caverly in 1894. The first great epidemic occurred in Scandinavia in 1905 and 18 months later 56% of the cases originally reported as paralysed still showed a residue.

Since that time poliomyelitis has continued to grow as an epidemiological problem until it reached an epidemic rate in the U.S.A. of more than 20 per 100,000 per year.

The poliomyelitis virus is an obligatory intracellular parasite which has been classified into 3 main types, each with several strains:

Type I: Brünhilde.
Type II: Lansing.
Type III: Leon.

The virus has been demonstrated in nature:

1. In Man. (In blood, oropharyngeal washings, and stools).
2. In Sewage.
3. On Flies.

The virus is present in the pharynx only during the early stage of the disease and never after the temperature has returned to normal, but it is excreted in the stools for periods up to 8 weeks, and abundantly during the first month. This has influenced isolation procedures in all countries where the disease has been a problem.

Isolation is generally maintained only until the temperature has abated and is not continued for a statutory 3 weeks. It is felt that once the danger of droplet infection has passed, any further period of isolation is no more than a pious gesture as sewage in any event teems with the virus from the hundreds of carriers or abortive cases who are fellow-travellers in any epidemic. Faeces constitute the greatest potential source of danger to the community. Apparently the period of greatest communicability is covered by the latter part of the incubation period (7–14 days) and the first week of the acute illness.

PROPHYLAXIS

1. There appears to be no value in closing schools or swimming baths during a polio epidemic and this is no longer done in the State of Massachusetts as a result of an intensive study carried out by the Harvard School of Public Health.

2. Routine immunization injections are timed so as not to coincide with periods when poliomyelitis can be expected. Especially are alum-precipitated preparations avoided as it is felt that they may play a part in the localization of paralysis. Polio vaccine, however, is not withheld although every attempt is made to have a community covered before the commencement of the polio season.

3. Excessive fatigue due to physical activity and sports is avoided as it definitely appears to influence the extent of paralysis.

4. Artificial active immunization with formaldehyde-inhibited virus (Salk) appears to give significant protection. In America everyone up to the age of 40 years has been encouraged to receive the vaccine.

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* From March to August 1957 the writer was in the United States of America as a Travelling Fellow under the aegis of the Institute for Rehabilitation in West Orange, New Jersey. Broadly, the terms of reference of the Fellowship were to study current methods of rehabilitation and reconstructive surgery in the U.S.A. Amongst others, one of the subjects chosen for special study was poliomyelitis. Courses and seminars were attended and personal visits made to the following centres:

The Institute for Rehabilitation, West Orange, New Jersey.
The Children's Medical Centre, Boston, Mass.
The Mary MacArthur Memorial Respirator Unit, Wellesley Hills, Mass.
The Respirator Centre, Mt. Sinai Hospital, New York. N.Y.
The Respiratory Centre for Poliomyelitis, Rancho Los Amigos, Hondo, Calif.
The G. F. Strong Rehabilitation Centre, Vancouver 9, B.C.
The Institute of Physical Medicine & Rehabilation, New York University, Bellevue Medical Centre, New York, N.Y.
The Hospital for Joint Diseases, New York, N.Y.
The Hospital for Special Surgery, New York, N.Y.

This report gives a brief but composite picture of observations made in these various centres as well as information obtained from various specialists. Reference has also been made to certain standard texts on the subject.

PUBLIC RELATIONS

It is important during an epidemic to have adequate channels for combating alarm and despondency amongst the public. To this end a *medical* committee should meet regularly during an epidemic and make authoritative statements for dissemination in the press and over the wireless. This should not be left to laymen, however well-intentioned they may be.

THE ACUTE STAGE

Throughout the U.S.A. and Canada the tendency is towards *team management* and away from the concept that the care of acute poliomyelitis is the concern of the infectious diseases physicians only.

The team consists of:

1. Physician (Infectious Diseases, Internist or Paediatrician).
2. Orthopaedic surgeon.
3. Otorhinolaryngologist.
4. Anaesthetist.
5. Physiotherapists.
6. Social service workers.
7. Orthopaedic appliance maker.

The following rules appear to be of great value in the management of the acute phase of poliomyelitis:

1. All cases are seen initially by the resident physician in the Isolation Department.

2. If in the doctor's opinion there is a strong suspicion of poliomyelitis an orthopaedic opinion is obtained from a registrar who, if he thinks it necessary, will call the visiting surgeon *before* a diagnostic lumbar puncture. The value of this procedure cannot be overemphasized as lumbar puncture frequently complicates an orthopaedic examination. All examinations at this stage and through the acute phase of the disease are conducted with the greatest care to avoid alarming, hurting or fatiguing the patient.

3. In cases where the diagnosis is in doubt, a lumbar puncture should be done. If obvious, it may be dispensed with at the discretion of the physician.

4. If the diagnosis is obviously not polio the patient should, if possible, *not* be admitted to a polio ward.

5. Patients are considered to be over the infectious stage when they have been:

i. *Without an elevated temperature for 48 hours,* or when

ii. *Seven days* have elapsed from the *onset* of the illness and the patient is *afebrile.*

6. If admitted within this category, they are sent to the Orthopaedic Ward and *not* to the Infectious Disease Ward.

7. Once they have reached this stage after treatment in the acute polio ward they are then transferred to the Orthopaedic Ward.

8. The exception to this is for bulbar and respiratory cases who continue under the care of the physician until the patient is well stabilized, i.e. able to handle his secretions and able to swallow safely. Once this is established, he is transferred to the Orthopaedic Ward for further care of limb, trunk and respiratory paralysis.

9. The Social Service should be used to the full. Parents or family should be interviewed early to allay alarm and despondency. The Social Service should have contact with the family and later with the patient right through the course of the disease and its sequelae.

10. The full facilities of the Physiotherapy Department are utilized while the case is in isolation, on the advice of the orthopaedic surgeon.

11. Patients with non-paralytic polio may be discharged home directly from the Isolation Wards once they have been seen by the Orthopaedic Department. As a general rule, all discharges should be by the Orthopaedic Department so that the necessary arrangements for follow-up of cases can be made.

12. While in the Isolation Wards, all patients are the primary responsibility of the physician who will arrange the day-to-day consultations with the orthopaedic surgeon or other specialists.

13. Once the patients are over the infectious stage, the primary responsibility lies with the orthopaedic surgeon, who will arrange the necessary consultations with the physician and other specialists. The exception is outlined in (8).

ORTHOPAEDIC CONSIDERATIONS

The primary reasons for the early entry of the orthopaedic surgeon into the picture are as follows:

1. To assess the extent and speed of spread of the paralysis during the early stages of the disease, as this is an excellent guide to the prognosis and may give the trained orthopaedic surgeon an indication of the probable pattern of recovery many months before it becomes apparent. Observation at this stage may save time and trouble later.

2. Prevention of deformities by splinting, posturing and stretching, if this is necessary. This work is delegated to the physiotherapists who work under the direction of the orthopaedic surgeon.

3. The physiotherapist gets to know the patients, especially children, while they are ill and is able to commence treatment more effectively once they reach the convalescent phase.

NURSING CONSIDERATIONS

1. *Admission.* Where possible, all cases are first seen in an Outpatient Department for examination and diagnosis. It is here that the lumbar puncture is performed after the orthopaedic examination has been carried out. The extent of this examination naturally depends on how sick the patient is and, in any case, is very brief. The person conducting the examination must therefore be experienced so as to glean the maximum of information with the minimum of disturbance to the patient.

2. *Beds.* All beds or cribs have full-length boards with firm mattresses. A foot-board is essential to help preserve good bed posture and prevent foot drop. A bed roll is usually used under the knees to relieve tight hamstrings. A lumbar pillow will comfort the back. Special nursing and posturing techniques have been worked out for the various regions of the body and aid materially in the patient's comfort and posture.

With available nursing staffs and the use of physiotherapists in the Isolation Wards, splinting is less rigid than was practised formerly. Usually softer and more pliable posturing aids are used.

3. *Hot Packs.* These are favoured in America and certainly do relieve muscle pain. Polio is a hot weather disease there as much as it is here, but the extra muscle heating is definitely of benefit.

4. *Secretions.* In bulbar polio, when the patient has trouble managing his secretions, the 2 methods of greatest value are posture and suction. The vast majority of cases are taken through this crisis by conservative means and, in most centres, the tracheotomy rate is low. (In California it was higher than in other centres).

5. *Mechanical Aids.* All nurses must be fully conversant with the danger signs of respiratory embarrassment and paralysis and must also understand the working of the tank respirators.

6. *Emergency Equipment.* The following items are always available in the acute polio ward and are checked regularly to see that they are fully operative and complete. 'Borrowing' should not be tolerated.

1. Tank respirator.
2. Tracheotomy set.
3. Bronchoscopy set.
4. Suction machine.
5. Laryngoscope tray with airways and endotracheal tubes.
6. Oxygen.
7. A vital capacity machine with disposable mouthpieces.
8. An electro-phrenic stimulator.

7. *Isolation.* Barrier nursing techniques are practised throughout. Hand scrubbing is done with pHisohex and not just by dipping the hands into a disinfectant solution. The best viricidal agent is thought to be Tincture of Iodine. As has been mentioned the period of isolation ends when the temperature has been normal for 48 hours.

THE CONVALESCENT STAGE

Once this stage of the disease is reached the patient becomes an orthopaedic responsibility, but consultative contact is maintained with the original physician for as long as is necessary. This stage lasts for as long as the patient makes progress in muscle recovery. It is divided into 2 periods:

1. *The Sensitive Phase.* Here muscle tenderness and tightness persist and it is here that deformities which may have been allowed to develop can still be eliminated or, if neglected, will become fixed and very difficult to deal with later. The mainstay of treatment from now on is physiotherapy, to which other requirements will be added as necessary. The most important detail is to move all joints through a full range of motion and to overcome contractures by stretching. This is a painful process, but is helped by hot packs or hydrotherapy. The aim is to regain full movements during this period. All deformities and contractures should be corrected by the time the muscle sensitiveness subsides; once the asensitive phase is reached, such contractures are much more stubborn and difficult to deal with.

2. *The Asensitive Phase.* This continues until the graph of muscle recovery flattens out about 18 months from the onset of the disease. Here the aim is maximal recovery of each affected muscle and it is here that intensive exercise and the progressive resistance exercises of Delorme and Watkins are of greatest value. It is now that the orthopaedic surgeon, who has full responsibility for the case, may request the assistance of the specialist in physical medicine.

Braces and splints are necessary to stabilize weak members and allow the patient to become ambulant and return to his place in society.

Regular follow-up clinics are held to modify individual programmes of treatment and to assess attainable goals.

The aim throughout is to prevent rather than correct deformity.

CHRONIC STAGE

This is the period when no further physiological recovery can be expected. The purpose now is to assess what anatomical changes are necessary to improve function.

Here functional training becomes important, the activity being in the direction of rehabilitation.

SPECIAL PROBLEMS

A. RESPIRATORY CRIPPLING

During the acute stage of poliomyelitis a certain proportion of patients will develop respiratory embarrassment or even paralysis, which will necessitate their receiving artificial respiration. Of these 85% will be in for a short period during the acute illness but will recover completely. A small number, however, will become respiratory cripples and require special treatment to wean them from mechanical aids before they can leave hospital. This group falls under the care of the orthopaedic surgeon, who enlists the aid of all other specialties he requires. A residuum of unfortunates will have to depend on some type of artificial respiration to the end of their days.

As this type of work is specialized and requires expensive equipment, the practice is to have Respiratory Centres which will serve a large area rather than have such unfortunates scattered widely about the country. The patients then receive optimum care with the greatest economy in apparatus.

Every acute polio hospital will naturally have what emergency equipment it needs but once the patient is a respiratory cripple requiring special rehabilitation procedures or permanent assistance, he is transferred to the Special Centre for this. In America, with the enormous financial resources of the National Foundation for Infantile Paralysis, the ultimate aim is to send every such patient home with the full complement of aids required in each particular case.

The equipment required in such a Unit includes the following items (quantities naturally have to be worked out on a regional basis):

1. *Tank Respirators.* Two types were encountered in the various centres visited:

(*a*) *Emerson.* This appeared to be the most popular as there was adequate room inside it for treatment and nursing care. It allows a 20° tilt into the head-down position in order to obtain postural drainage in bulbar cases. A positive pressure dome is available so that respiration can be continued when the respirator is opened for nursing care. The motor and bellows are part of the chassis, allowing for easy mobility.

(*b*) *Drinker-Collins.* This is lighter and smaller. It is just as efficient, but the few models seen did not have positive pressure domes.

Many accessories are available on both.

(*c*) *Portalung.* This is a Huxley model which is fully portable as a type of stretcher. It can work off mains or a battery and is invaluable for bringing a case from the acute hospital to the Respiratory Centre.

Comment: The English iron lungs compare favourably. They are smaller and lighter and probably much cheaper.

2. *Cuirasse Respirators.* Several types were encountered.

(*a*) *Technicon-Huxley.* A chest-abdomen shell which was generally considered to have the greatest range of ventilatory effectiveness. Different sizes are available. They are uncomfortable in the sitting position and it is difficult to turn the patient and maintain the seal. It will work off mains or a battery.

(*b*) *Emerson.* This is a chest respirator, comfortable for sitting. It can operate from a battery, if required.

(*c*) *Monaghan.* A chest respirator. Both hospital and portable models are available, the latter working off a battery, if necessary.

3. *Rocking Beds.* These are particularly valuable for the patient who has a certain amount of unassisted time. Such cases should be weaned from the tank respirator to the rocking bed via the cuirasse. Several types were encountered.

(*a*) *Emerson.* Standard hospital, intermediate and home models are available. They weigh between 300–500 lb. and are about 6′ 6″ long. Their rocking rates are 15–26 per minute, which is adequate. Shorter beds with faster rates are available for children.

(*b*) *Burns.* This is lighter and lower than the Emerson and has a range from 12–28 per minute. It is equally effective.

(*c*) *McKesson.* } These are also in use. They are
(*d*) *Tomac.* } heavier, higher and longer.

Most rocking beds have a pump attachment so that a cuirasse can be synchronized with it.

4. *Positive Pressure Breathers.* A certain proportion of patients with no voluntary respiratory power is able to respire by positive pressure taken through a mouth piece. This makes them reasonably mobile and adds to their comfort in hot weather. It has been found to be particularly valuable in lactating

women whose breasts become engorged in the pressure-cycled chamber respirators.

5. *Emerson Bellows Resuscitator.* This is of immediate use in emergencies and of help in transporting patients about the hospital or even in transfers from one hospital to another.

6. *Vital Capacity Machine.* Various types of spirometer are available and necessary in a Special Centre.

7. *Investigations.* Besides adequate laboratory facilities for the study of all pathological and physiological problems, certain equipment for direct reading of blood chemistry is of great value.

Besides the importance of the Respiratory Centre for the patients who will be permanent cripples, it must be borne in mind that a proportion of individuals who have undergone successful respiratory rehabilitation may require further periods of treatment during intercurrent illnesses or when surgery is indicated.

Such a centre should also act as a central store for emergency respiratory equipment which might be required peripherally during epidemics. It is of no value to allow an expensive and intricate piece of equipment to gather dust and become inefficient in some district hospital during the off season.

B. FOLLOW-UP OF CASES

The assessment of poliomyelitis cannot be adequately carried out in the midst of a busy general Orthopaedic Out-Patient Department as cases require long study and deliberation. Special Polio Clinics are required where paralysis and deformity can be studied and where growth predictions can be worked out in the event of inequalities of leg length. Paralytic scoliosis is itself a major problem requiring specialized care.

C. REHABILITATION

The treatment, after care and training of the case with minor paralysis, can be carried out adequately in a general hospital. However, those patients with severe degrees of residual paralysis and crippling require special treatment and training to enable them to become self-sufficient, if this is at all possible. Such cases cannot be handled successfully in the Physiotherapy Department of a general hospital because the time available for individual treatment is insufficient. They require constant attention to and modification of orthopaedic aids. This calls for the Treatment Centre to be in close proximity to a well-equipped orthopaedic workshop. In addition, the whole day should be taken up with treatment and training aimed at mastering the activities of daily living and intensive physiotherapy and occupational instruction. This service should be such that it can be run on either an in-patient or out-patient basis, depending on the individual needs of the patient.

D. SOCIAL SERVICE

One was struck by the extent to which the Social Worker is integrated into the overall programme in the U.S.A. A social worker has early access to the patient, especially in the case of a wage-earner, and is able, by counselling and assistance, to see the family through the financial and social crises that accompany any illness of long duration and possible residual disablement. It is felt that this is a definite forward step in the complete picture of care of patients and its introduction is favoured in this community.

OPSOMMING

Die metodes wat in die Verenigde State toegepas word om poliomiëlitis te bestry, word kortliks in oënskou geneem. In sommige state dring die openbare gesondheidsowerheid nie daarop aan dat skole of swembaddens tydens 'n epidemie gesluit moet word nie. Die Salk-entstof word feitlik allerweë aanvaar, en almal wat 40 jaar of jonger is, word aangemoedig om hulle te laat immuniseer.

Versorging deur 'n span is van die allergrootste belang tydens die akute stadium van die siekte, en die ortopediese chirurg verkry vroeë toegang tot die pasiënt, selfs gedurende die afsonderingstyd. Die pasiënt word egter net afgesonder tot tyd en wyl sy temperatuur 48 uur lank normaal gebly het; daarna word hy aan die sorg van die ortopediese afdeling toevertrou.

By die verpleging van die polio-lyer word spesiale aandag aan die soort bed en die houding en gerief van die pasiënt bestee. Warm inwikkelings word gebruik. Die noodsaaklikheid daarvan dat almal volkome op hoogte van die meganiese noodhulpmattreëls moet wees, word beklemtoon.

Tydens die hersteltydperk word alle moontlike pogings in die werk gestel om verkorting te bowe te kom ondanks die pyn, want hierdie verkortings is minder vatbaar vir behandeling as die a-sensitiewe fase eers bereik word. Die doel is om misvorming te voorkom, liewer as om dit te verbeter.

Daar word kortliks verwys na die probleem van asemhalingsverminking, en die beskikbare meganiese hulpmiddels word in oënskou geneem. Die noodsaaklikheid van spesiale klinieke vir die na-versorging van polio-slagoffers word genoem, en die rol van rehabilitasiebehandeling en die werk van 'n maatskaplike diens word beklemtoon.

ACUTE POLIOMYELITIS*

A STUDY OF THE CLINICAL MANIFESTATIONS OF FIFTY CASES

SEEN AT THE CHILDREN'S HOSPITAL, JOHANNESBURG, DURING THE 1948 EPIDEMIC

WITH SPECIAL REFERENCE TO THE MANAGEMENT IN THE ACUTE PHASE

J. L. BRAUDO, M.B., B.CH., M.R.C.P. (EDIN.)
Johannesburg

(*Continued from page* 521)

VI. MANAGEMENT OF THE ACUTE PHASE

The acute phase can be defined as that period between the onset of the disease on the one hand, and the disappearance of pyrexia and extension of the disease process on the other. In the average case this phase lasted 10–14 days, when the patient entered the convalescent stage.

All suspected or proven poliomyelitis cases were put to bed immediately, hospitalized and isolated where possible. Fatigue and chilling were avoided, since they induced or aggravated paralysis. Patients were nursed flat (the most comfortable position) with fracture boards to prevent the spine from sagging and foot boards to prevent foot drop. Cradles in every case kept the weight of the bed clothes off the feet. The children were handled with great care in the acute febrile stage when only a brief examination and a lumbar puncture were done. Excessive examination and handling were avoided since they induced pain and discomfort which made the patients resentful and unco-operative. Vigorous hot packs, drug therapy to relieve muscle tenderness, and physiotherapy, were excluded in the early acute febrile stage. As soon as the child improved, a more detailed examination of the muscular system and measures to induce painless, passive, muscular movement, along with physiotherapy, were begun.

The patient's nutritive requirements (food, fluid, electrolytes, vitamins and minerals) were carefully watched and supplemented if necessary.

Analgesics (aspirin) were freely administered for severe spontaneous muscle pain and stiffness. Sedatives were only given with great caution in this early stage, since they depressed the already involved respiratory centre and swallowing mechanism and could induce or aggravate anoxia. They were not contraindicated later in the acute phase when the respiratory mechanisms were functioning satisfactorily. On the other hand, sleep is vital to the sick patient and drugs with very little effect on the respiratory mechanism, e.g. chloral, can be given.

Constipation was extremely common and was best treated with saline enemata every 3–4 days. Urinary retention occasionally occurred but mostly did not persist for more than 24–48 hours. In mild cases catheterization was harmless, since it was only employed for a very short time, thus minimizing the possibility of urethritis and ascending infection. Furmethide-furfumyltrimatyl ammonium chloride (a parasympathomimetic with particular action on the bladder) has been recommended.[93] It is given subcutaneously. Adequate dosage produced complete voiding of urine in less than 15 minutes in over 70% of 25 cases. Furmethide can be repeated without diminution in its action. The side effects are minimal. Drug therapy was not resorted to in this series.

The handling was managed by the trained physiotherapist, the orthopaedic surgeon and the attending physician. Cases with bulbar poliomyelitis required constant attention by the otolaryngologist. Indeed, constant supervision of all cases was instituted. This was essential when bulbar and respiratory mechanisms were involved since emergency therapy could be life-saving.

The specific management of the various clinical types will now be considered.

NON-PARALYTIC SPINAL GROUP

These patients usually required no further therapy. Those with moderate or severe muscle dysfunction were treated with hot packs (Kenny method)[95] when adequate nursing staff was available. Others had prostigmine

* The References will be published at the end of the concluding article in this series.

or curare. Intravenous tetra-ethyl-ammonium chloride (TEAC) was very effective in most cases in which it was employed.[94] The pain and the spasm of the muscles were ideal for the production of temporary and even permanent skeletal deformity—scoliosis, foot drop, etc. Since the painful muscles were resistant to, and irritated by, stretching, the affected parts naturally assumed an unphysiological position of comfort (e.g. flexed knees in the case of hamstring dysfunction). Moreover, the shortened muscles developed a passive type of contracture and, if the position became fixed, were permanently shortened in a fixed deformity. No single case of deformity associated with muscle dysfunction only was noted in this series, but there were several such adult cases in the same epidemic. Their response to sympathicolytic therapy was rapid and sustained. It is therefore imperative to treat moderate and severe muscle dysfunction with muscle shortening as soon as the acute phase of the disease has passed. Deformities in non-paralytic poliomyelitis should then never occur.

SPINAL PARALYTIC GROUP

Apart from general measures and the alleviation of painful shortened muscles, therapy was directed to maintenance of the optimum position at rest for the weakened muscles, and the removal of any factor interfering with recovery. In the acute pyrexial phase the patients were disturbed as little as possible, but the affected parts were correctly positioned with sandbags and light splints where necessary. The optimum positions were as follows:

Foot—at a right angle from the horizontal with no inversion or eversion.
Knee—in 5° flexion with no varus or valgus.
Hip—15–20° of abduction with no flexion or rotation.
Back—flat.
Head and neck—straight without flexion or extension.
Shoulder—abduction with external rotation for part of the time.
Elbow—flexed to a right angle.
Wrist—dorsiflexion.
Fingers and thumb—the grasping position.

Muscle tenderness and shortening were eradicated as soon as possible because the combination of weakness and shortening contributed to deformity and contracture. Deformities and contractures were in themselves disabling and inhibited the function and recovery of normal or weakened muscles by overstretching them and preventing the normal physiological reciprocal innervation of muscle, i.e. relaxation of the agonist while the antagonist contracted. Thus the whole smooth action of the skeletal system became dislocated and re-education difficult, prolonged and arduous.

Exercises. These were carried out under the supervision of a trained physiotherapist and included passive and active movements. Passive movements were commenced immediately the temperature had settled, and were directed towards the prevention of contractures of both muscles and joints. All joints were put through a complete range of movement at least once a day. The most opportune time for this treatment was soon after the TEAC, which removed the painful state of the muscles and considerably lessened the shortening of the muscles, thereby permitting a far greater range of painless movement. Movements were not forced. As full a range as possible, without provoking pain, was attempted. This was a most important consideration, since the children resisted all forms of therapy if pain and discomfort were induced or accentuated.

Guided, assisted exercises were combined with passive movements early on. The weak and paralysed muscles were exercised so that they could participate in their normal patterns of movement. Exercises were performed comfortably over a painless arc with the parts carefully supported and assisted. Muscles were carefully guarded against any fatigue. The principles followed were:

(*a*) Only a few muscles were called upon to function at the onset and the number of muscles at work was slowly increased.

(*b*) Muscles completely paralysed were put through their normal ranges of movement with the patient attempting to perform the motion synchronously with the therapist.

(*c*) The therapist made sure that the substitution of stronger muscles did not occur and all trick movements were recognized and avoided.

The physiotherapist's role at this stage was most important. She guided all the neuromuscular units and prevented mental alienation.[95] Her tact, sympathy and the variety of movements with the ever-increasing substitution of active movement, played an invaluable role in the salvage of damaged muscles.

The Support of Parts. Splints were only used when the simple measures (good nursing, foot board, cradle, sandbags) failed to maintain the accepted optimum position. They were made of light Cramer wire or even plaster if necessary and were taken off several times daily to allow passive and active movement.

Underwater Exercises. This was not employed in the painful phase because of the lack of facilities. It was highly recommended by Green[89] who stated:

'The warm bath is relaxing, relieves sensitivity and muscle spasm, thus assisting the worker in developing ranges of movement and correcting deformities'.

Most children love the water and the increased range of movement under water encourages the child in his attempts at motion once he is removed from it.

BULBAR CASES

These can be divided as:

1. Cranial nerves only.
2. Cranial nerves and spinal paralysis.

The therapy of these cases depended on the type of lesion present, its clinical manifestations and threat to life. Since the incidence of bulbar poliomyelitis was high in this series (14 cases (28%) of a total of 50) and its threat to life correspondingly so, correct handling was absolutely essential. In the 1946 Minnesota epidemic the incidence of bulbar involvement was 23% in children under 16 years, and even higher beyond that age,[29] whereas Wickman[4] noted an incidence of only 6%. Bulbar poliomyelitis was only recorded in 9% of 500 cases analysed in the 1947–8 Johannesburg epidemic. The increasing importance of bulbar poliomyelitis and its implications have been stressed by many workers.[29, 37]

The classification of bulbar poliomyelitis recommended by Brown and Baker[37] will be used to detail the handling of each group.

Group 1. Cranial nerve nuclei involvement.
  (i) Upper cranial nerve group.
  ii. Lower cranial nerve group.
Group 2. Affection of the vital centres.
  i. Respiratory centre.
  ii. Circulatory centre.
Group 3. Combined bulbar and upper spinal involvement.

TABLE 17: THE DISABILITY IN AND THERAPY OF BULBAR AND BULBO-SPINAL POLIOMYELITIS

Disability	*Treatment*
1. *Cranial Nerve Involvement* (IX—XII)	
(*a*) Pooling of secretions due to paretic throat muscles.	Posture and aspiration; oxygen.
(*b*) Paralysis of the tongue.	Posture and aspiration.
(*c*) Obstructed airway due to reflex spasm of laryngeal musculature.	Posture and aspiration; oxygen.
(*d*) Obstructed airway due to abductor paralysis of the vocal cords.	Tracheotomy, aspiration; oxygen and posture, if if necessary.
(*e*) Accumulation of secretions due to inability to cough.	Posture, aspiration, oxygen, tracheotomy and iron lung, if necessary.
(*f*) Aspiration of vomit or secretions.	Posture, aspiration, bronchoscopy and tracheotomy, if necessary.
2. *Respiratory Centre Involvement*	
(*a*) Inefficient irregular breathing.	Oxygen.
(*b*) Periods of apnoea.	Respirator.
3. *Circulatory Centre*	
Vasomotor failure.	Continuous oxygen, plasma transfusions. Noradrenaline and steroids.
4. *Spinal Cord Involvement*	
(*a*) Paralysis of primary muscles of respiration.	Respirator and oxygen, if necessary.
(*b*) Spasm of intercostal muscles.	Etamon, hot packs or Priscoline.
5. *Bulbar and Spinal Cord Involvement*	
4*a* and 4*b* and any of the above causes.	Respirator, continuous oxygen, posture, aspiration and tracheotomy, if required, or Etamon.
6. *Alterations in Lungs*	
(*a*) Pulmonary oedema.	Oxygen under positive pressure, mercurial diuretics, ? digitalis, postural percussion drainage, bronchoscopy.
(*b*) Atelectatis	
(*c*) Complicating pneumonia.	Antibiotics (penicillin, streptomycin, aureomycin) and oxygen.

GROUP 1: CRANIAL NERVE NUCLEI INVOLVEMENT

i. *The Upper Cranial Nerve Nuclei Group* includes the ocular nerves (III, IV and VI) as well as V, VII and VIII. They do not require any specific therapy in the acute stage and present no serious threat to life. Paralysis of the Vth nerve may cause difficulty in mastication. With bilateral involvement, nutritious food in the form of fluid and slops should be prescribed. Vertigo and vomiting may arise when the VIIIth nerve is involved and if severe would require therapy. Vertigo may be alleviated by the anti-histamine or Dramamine group of drugs. Severe continuous vomiting necessitates the discontinuation of all food and fluid by mouth and its replacement by the intra-gastric or intravenous route. Eighth nerve involvement is very rare in poliomyelitis. Vertigo and vomiting are distressing but transient. They lasted 24–48 hours in a few cases in the 1946 Minnesota epidemic.[28] There were no instances of either Vth or VIIIth nerve involvement in this series.

The real importance of these isolated or combined upper cranial nerve palsies was that they focused the physician's attention on the possibility of involvement of the vital centres.

ii. *Lower Cranial Nerve Group.* Involvement of the lower cranial nerves, particularly the vagus, is a definite threat to life. With the inability to swallow there is the constant tendency towards pooling of saliva and food in the pharynx. This accumulation in itself stimulates the production of further salivary secretion and obstructs the airway. A further threat to the airway arises from the aspiration of fluid into the larynx and reflex spasm of the glottis. Furthermore, lesions of the vagus give rise to weakness of the vocal cords themselves. This may result in stridor or rapid abductor paralysis of both cords with sudden closure of the glottis, asphyxia and death.

The clinical and morphological effects of hypoxia or anoxia on the brain and other organs of the body have been well studied. Thorner and Leary[96] showed that single periods of anoxia lasting 60 seconds might produce distinct morphological change in brain tissue. Brain cells actually become necrosed after a few minutes of anoxia and repeated anoxia produces widespread cerebral damage. Apart from its effects upon brain cells, the critical results of anoxia on the vasomotor and respiratory centres, the permeability of pulmonary alveolar capillaries, and the heart itself, cannot be ignored.

Anyone handling patients with respiratory defects and the resultant anoxia cannot fail to be impressed by the symptoms and signs of oxygen lack and their dramatic response to corrective therapy. These can be divided into 5 stages:

Stage I. An increase in pulse and respiratory rates.

Stage II. Restlessness, anxiety, apprehension and sleeplessness.

Stage III. Florid appearance, increasing respiratory effort and blood pressure, euphoria, a tendency to speak fewer words in one breath and a disinclination to talk, flaring of alae nasi and use of accessory muscles of respiration.

Stage IV. Dyspnoea, commencing cyanosis, rise in temperature, some confusion and occasional panic reaction.

Stage V. Increasing cyanosis, circumoral twitching, failure to answer questions, delirium, coma and terminal shock.

Naturally the earlier therapy is begun the better, but cases have recovered even when they manifested some of the features of Stage V.

Humidified Oxygen Therapy. This was absolutely essential in all cases with suspected or predicted hypoxia. In this series the oxygen was bubbled through water and administered by nasal catheter, oxygen tent, B.L.B. mask or intratracheally. Although 100% oxygen mixtures could be administered without danger for short periods (1 to 2 days) it was advisable to use 40–60% mixtures routinely.[37] In cases of severe anoxia or pulmonary oedema, 100% oxygen mixtures were indicated. Brown and Baker[37] stressed the danger of producing pulmonary oedema by giving oxygen into the tracheotomy tube. They recommended a pressure no greater than 2–6 cm. H_2O and a concentration between 20–40%. Excessive amounts of oxygen are not without danger. A variety of symptoms associated with oxygen toxicity have been described, especially in cases of long-standing, chronic hypoxia, e.g. chronic hypertrophic pulmonary emphysema.

Estimations of arterial oxygen saturation by means of an oximeter are of inestimable value in planning adequate therapy. No such apparatus was available in this study.

All patients in this series were taken off oral food and fluids, with the substitution of intra-gastric or intravenous alimentation. In most cases the intravenous route was preferred since the insertion of the gastric tube proved difficult and always carried with it the danger of vomiting, aspiration pneumonia and oesophageal ulceration. Prophylactic antibiotic

therapy was employed routinely in all cases. In Case 2 of the bulbo-spinal group intragastric gavage proved most satisfactory.

Posture. The foot of the bed was raised about 18 inches from the ground with the patient prone and the head to one side. This facilitated gravitation of secretion from the pharynx into the mouth, from which it was removed by continuous or intermittent suction, depending upon the efficiency of either method. Great care was exercised in using aspiration, since too powerful suction could traumatize the mucous membranes, and too frequent and vigorous use might disturb and frighten the child and even cause retching. The child is first accustomed to the suction applied around the lips and gums. Only then is suction applied where it was most effective, viz. the root of the tongue just above the larynx.

In Cases 19, 22 and 23 of the bulbar group, these means were most satisfactory. However, in Case 26 a tracheotomy proved life-saving since there were still signs of hypoxia despite continuous oxygen and the adequate removal of secretions.

Tracheotomy is a radical step. It furnishes a free airway so that the air for respiration does not need to move down a pharynx full of secretions or through a larynx continually in spasm or closed due to bilateral abductor paralysis. The indication in the cases with pharyngeal palsy depends on the success of the other 2 forms of handling the secretion, viz. posture and aspiration. Although the pharynx may be kept clear enough by these methods to prevent only occasional choking, the latter effort excessively tires the patient, in which event tracheotomy is indicated. Tracheotomy is indicated in cases of true laryngeal dyspnoea recognized by retraction of the suprasternal notch, intercostal spaces and epigastrium, associated with anxiety, drowsiness and a fear of going to sleep. It is essential in respirator patients with pharyngeal or laryngeal palsy. Tracheotomy should be performed under an anaesthetic such as Avertin, since local anaesthesia in itself might cause a marked tachycardia, apart from increasing the anxiety and apprehension which so often accompanies its use. If properly performed the complications of infection, mediastinal emphysema, etc. are most unlikely.

Brown and Baker[37] recommended tracheotomy in all cases of rapidly progressive bulbar involvement, since some cases might have some difficulty in swallowing, followed within an hour by severe cyanosis and death. They stated that unless the rapid progression of symptoms was anticipated in these patients and their airways kept open mechanically, many cases died.

Tracheotomy is not to be undertaken too lightly and was only indicated in a small percentage of the bulbar cases. It should be carried out long before choking and cyanosis make it obviously necessary as a last desperate attempt to save life. In this group it was definitely indicated in 2 cases (Cases 24 and 26) and was done prophylactically in Case 5. The relaxation and improvement induced by the procedure in Case 26 was most dramatic.

Bronchoscopy. In cases with collapse of the whole or a major portion of a lung due to bronchial block unrelieved by postural drainage, bronchoscopy may be required. Furthermore, those cases with very poor respiratory movement and cough reflex are especially prone to the accumulation of bronchial secretions and consequent bronchial block. However, the cases requiring bronchoscopy in the acute stage have to be very carefully selected.

(To be continued)

NOTES AND NEWS : BERIGTE

Mr. Theo Lorentz, F.R.C.S. (Eng.), F.R.C.S. (Edin.), has commenced practice as a Specialist General Surgeon at 32 Lister Building, Jeppe Street, Johannesburg. (Telephones: *Rooms*: 23-5030; *Residence*: 45-1649).

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Mr. S. Skapinker, F.R.C.S., has moved his consulting rooms to suite 602 Medical Arts Building, Jeppe Street, Johannesburg. His telephone numbers remain the same, viz. *Rooms*: 23-6646; *Residence*: 42-2380.

Mr. S. Joel Cohen has returned from a trip overseas during which he lectured and operated in the United States and Canada.

At Montreal he read a paper to the Second World Congress on Gynaecology and Obstetrics on *Gynaecology in the Albert Schweitzer Hospital, Lamberene.* He also delivered an address at the University of Louvain in Belgium.

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Maybaker (S.A.) (Pty.) Ltd., McHardy Avenue, Holland Park, Port Elizabeth, announce that their new telephone numbers are: 4-5481/3.

MEDICAL MEMBERS OF PARLIAMENT

I: Dr. Z. de Beer, M.P. (*Maitland*)
[Photograph: The Cape Argus]

* * *

Dr. Roy Morris, M.D., M.R.C.P.E., Physician, wishes to inform his colleagues that he has moved his consulting rooms to 3rd Floor, Clarendon Centre (off Clarendon Circle), 4 Park Lane, Parktown, Johannesburg. The telephone number (44-2889) remains unchanged.

Dr. Roy Morris, M.D., M.R.C.P.E., Internis, wens sy kollegas in kennis te stel dat hy sy spreekkamers verplaas het na 3de Vloer, Clarendon Centre (af Clarendon Circle), Parklaan 4, Parktown, Johannesburg. Die telefoon nommer (44-2889) bly dieselfde.

* * *

Mr. Hugh Benjamin, F.R.C.S. (Ed.), F.R.F.P.S., Surgeon, wishes to inform his colleagues that he has moved his consulting rooms to 3rd Floor, Clarendon Centre (off Clarendon Circle), 4 Park Lane, Parktown, Johannesburg. The telephone number (44-1998) remains unchanged.

Dr. Hugh Benjamin, F.R.C.S., F.R.F.P.S., Chirurg, wens sy kollegas in kennis te stel dat hy sy spreekkamers verplaas het na 3de Vloer, Clarendon Centre (af Clarendon Circle), Parklaan 4, Parktown, Johannesburg. Die telefoon nommer (44-1998) bly dieselfde.

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UNIVERSITY OF NATAL MEDICAL SCHOOL

The following candidates have completed the requirements for the degrees of M.B., Ch.B. of the University of Natal:

Marivate, C. D.
Mbambo, M. S. (Miss).

A COURSE IN ELECTROCARDIOGRAPHY

A course of 8 lectures is being given by Dr. L. Schamroth of Baragwanath Hospital on:

An Elementary Introductory Course to Electrocardiography. Lectures began on Tuesday, 5 August 1958, at 5.15 p.m. in Medical House, Esselen Street, Johannesburg. They will continue at the same time and place every Tuesday thereafter.

Please notify the Honorary Joint Secretaries by letter of your intention to attend the course, in order to facilitate necessary arrangements.

Write to: The Honorary Joint Secretaries, The S.A. Society of Occupational Health, Care of Dr. B. Serebro, 129 Union Centre, 31 Pritchard Street, Johannesburg.

* * *

ELI LILLY MEDICAL RESEARCH FELLOWSHIP (SOUTH AFRICA)

The Selection Committee has appointed Dr. E. B. Dowdle as the Lilly Fellow for 1958.

Dr. Dowdle is at present working at the Queen's University of Belfast, Northern Ireland, under Prof. G. M. Bull, Professor of Medicine at Queen's University.

Dr. Dowdle's research project will be concerned with morbid renal physiology, with a stable strontium as a marker for abnormal calcium metabolism. He will work either under Dr. Loeb at the Presbyterian Hospital in New York or under Dr. Schwartz at the Massachusetts General Hospital in Boston.

* * *

The 1958 scholarship of $2,500 was presented to Dr. W. P. U. Jackson of Cape Town, at the annual dinner of the Endocrine Society on Friday, 20th June, in San Francisco. The funds for the award were provided by the Upjohn Company for the purpose of furthering research in endocrinology. The Committee of the Endocrine Society selects the recipient.

Dr. W. P. U. Jackson (*right*) in Kalamazoo with Dr. Fenimore T. Johnson, Medical Director of Upjohn International Operations, Inc.

Dr. Jackson is on the Staff of the Department of Medicine, Cape Town University, and also at Groote Schuur Hospital. His work in the field of prediabetes, particularly the detection of individuals who are prone to develop diabetes eventually, has attracted world-wide recognition. Other recipients of the Endocrine Society's Upjohn award have included Dr. Fuller Albright of Harvard University in Boston, Massachusetts and Dr. Rachmiel Levine of The University of Chicago.

SKF LABORATORIES AWARD FOR POST-GRADUATE CLINICAL STUDY IN SOUTH AFRICA

This award has been established by a grant from SKF Laboratories (Pty.) Limited, P.O. Box 784, Port Elizabeth. This is the South African branch of Smith, Kline and French Laboratories Ltd., London.

The Selection Committee (an entirely independent board of medical practitioners) consists of the following:

Prof. J. F. Brock (Cape Town);
Prof. G. A. Elliott (Johannesburg);
Dr. H. A. Shapiro (*Honorary Chairman,* Johannesburg);
Dr. M. Shapiro (Johannesburg);
Dr. M. M. Suzman (Johannesburg);
Prof. H. W. Snyman (Pretoria).

Applications are invited from registered *general practitioners* who have been in active practice in South Africa for at least 7 years.

The Bursary is intended for post-graduate clinical study and not for medical research. It is available for not less than a 2-month period at any Medical School in South Africa.

The total value of the Bursary is £200.

The candidate must submit a brief statement of his proposed course of study and indicate the institution at which he intends to undertake it.

No payments will be disbursed to the successful applicant until he has satisfied the Selection Committee that he has been accepted for the period of post-graduate study at a South African Medical School.

Applications must be made on the prescribed form which is obtainable from:

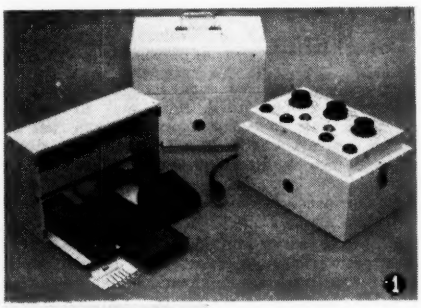
Dr. H. A. Shapiro (Honorary Chairman), Selection Committee, SKF Laboratories Award for Post-Graduate Clinical Study, P.O. Box 1010, Johannesburg.

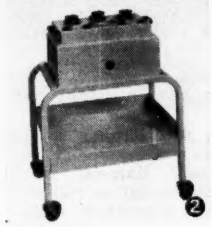
Closing date for applications: 26 August 1958.

PREPARATIONS AND APPLIANCES

BLENDTOME

Medical Distributors (Pty.) Ltd., of 252 Jeppe Street, Johannesburg, are introducing the *Blendtome,* a portable electro-surgical unit, manufactured by the well-known Birtcher Corporation of Los Angeles, U.S.A.





1. Portable Model.
2. Office Model on Stand.

The unit supplies 4 types of current: a tube generated 'cutting' current that cuts with ease; a 'spark gap' current that produces excellent coagulation; a 'monopolar' current for all techniques requiring fulguration and desiccation of shallow growths, and a 'blended' current when a combination of cutting and coagulation is required.

The *Blendtome* is the ideal unit for all types of minor surgery, particularly gynaecology, ear, nose and throat work, rectal surgery and dermatology. Cervical conization may be undertaken even when scar tissue is present and biopsy specimens can be resected without burning of the tissue.

The apparatus is fully guaranteed for 2 years, weighs just over 30 lb. and is reasonably priced at £125.

The sole Distributors of Birtcher Equipment in South Africa, Medical Distributors (Pty.) Ltd., P.O. Box 3378, Johannesburg and P.O. Box 3077, Cape Town, will gladly supply further particulars and arrange for a demonstration of the apparatus at your convenience.

CORLAN PELLETS

HYDROCORTISONE HEMISUCCINATE SODIUM FOR APHTHOUS ULCERS

Description: Each *Corlan* Pellet contains 2.5 mg. hydrocortisone as the water-soluble ester, hydrocortisone hemisuccinate sodium.

Indications: Primarily for simple aphthous ulceration in the mouth; also for aphthous ulceration complicating sprue, idiopathic steatorrhoea and ulcerative colitis. Helpful in dental practice, e.g. sensitivity reactions to denture material, but not for traumatic conditions due to poorly fitting plates.

Corlan Pellets should not normally be used in the presence of gross sepsis of the mouth, or for the treatment of such oral infections as thrush and Vincent's angina, except as an adjuvant to specific chemotherapy.

Administration: *Corlan* Pellets should not be sucked but should be kept in the mouth and allowed to dissolve slowly, in close proximity to the actual ulcer or ulcers.

Dosage: *Minor Aphthous Ulceration*: One pellet four times a day.

Major Aphthous Ulceration: Initially, as for minor ulceration. Thereafter, it is desirable to continue with a maintenance dose of 1-2 pellets a day in the moderately severe cases or 3-4 pellets a day in the most severe cases. If complete freedom from ulceration has been achieved for some months, therapy can cease, to be

resumed at the first sign of recurrence.

Storage: Store in a cool dry place.

Reference: Truelove, S. C. and Morris-Owen, R. M. *Brit. Med. J.*, 1958, *i*, 603.

Glaxo Laboratories (S.A.) (Pty.) Ltd., Manchester Road, Wadeville, Transvaal.

KANTREX

(KANAMYCIN SULPHATE)

Description: *Kantrex* is a new antibiotic derived from *Streptomyces kanamyceticus*. It is bactericidal against a wide variety of Gram-positive and Gram-negative pathogens, including many resistant strains of *Micrococcus pyogenes* var. *aureus*.

Indications: As with other antibiotics, the sensitivity of the organism to the drug, the duration and extent of infection before treatment, and the presence of associated anatomic or physiologic abnormalities may necessitate additional medical or surgical attention.

Indications for *Kantrex* include infections due to kanamycin-sensitive organisms, particularly strains resistant to other antibiotics:

Respiratory Infections: Tracheitis, bronchitis, pneumonitis, broncho-pneumonia, lung abscess, pleuritis, empyema and bronchiectasis.

Urinary Tract Infections: Acute and chronic pyelonephritis, cystitis.

Soft Tissue Infections: Wound infections, abscesses, cellulitis.

Blood Stream Infections:

Osteomyelitis:

Dosage: *Adults*: Average daily intramuscular dose 1 to 2 g. in 2 to 4 equally divided doses.

Children: Average daily intramuscular dose 15 to 30 mg. per Kg. in 2 to 4 equally divided doses.

Precaution: In the course of extensive clinical trials, signs of renal irritation and skin eruptions (which disappeared on cessation of therapy) were occasionally noted. Signs of eighth nerve dysfunction —tinnitus, vertigo and loss of hearing—were observed in a few patients. These patients were predominantly over 45 years of age; all had received 18 g. or more of *Kantrex*. In this latter respect it would appear that *Kantrex* has less toxic potential than streptomycin.

Supply: *Kantrex* is available in rubber-capped vials as a ready-to-use sterile aqueous solution in two concentrations:

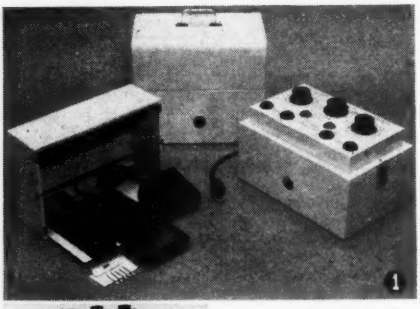
Kantrex (kanamycin sulphate) 0.5 g. in 2 ml. volume.

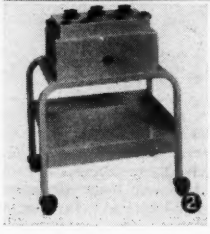
Kantrex (kanamycin sulphate) 1.0 g. in 3 ml. volume.

PREPARATE EN TOESTELLE

BLENDTOME

Medical Distributors (Eiens) Bpk. van Jeppestraat 252, Johannesburg, bied met genoeë aan: die *Blendtome*, 'n draagbare elektro-chirurgiese eenheid vervaardig deur die welbekende Birtcher Korporasie van Los Angeles, V.S.A.





1. Draagbare Model.
2. Kantoormodel op Staander.

Die eenheid voorsien vier verskillende strome: 'n elektroniese buisontwikkelde ‚sny' stroom wat met gemak sny; 'n ‚vonk gaping' stroom wat uitstekende koagulasie voortbring; 'n ‚eenpool' stroom vir enige tegniek vir fulgurasie en dessikasie van oppervlakkige groeisels en 'n ‚gekombineerde' stroom wanneer 'n kombinasie van sny en koagulasie nodig is.

Die *Blendtome* is die ideale eenheid in gevalle van minder ernstige operasies veral in ginekologie, oor, neus en keel werk, rectum heelkunde en vel groeisels. Servikale konisasie kan gedoen word al is daar letsel-weefsel teenwoordig en biopsie monsters kan gedoen word sonder dat die weefsel geskroei word.

Die apparaat is gewaarborg vir 2 jaar, weeg net oor 30 pond en verkoop teen 'n redelike prys, naamlik £125.

Die Uniale verspreiders van Birtcher apparaat, Medical Distributors (Eiens.) Bpk., Posbus 3378, Johannesburg en Posbus 3077, Kaapstad, sal met graagte verdere besonderhede verskaf en reëel vir 'n demonstrasie van die apparaat wanneer dit u pas.

CORLAN PELLETS

HIDROCORTISONE-HALFSUKSINAATNATRIUM VIR AFTEUSE SERE

Beskrywing: Elke *Corlan*korrel bevat 2.5 mg. hidrocortisone in die vorm van die in water oplosbare ester, hidrocortisone-halfsuksinaatnatrium.

Aanwysings: Hoofsaaklik, behandeling van eenvoudige afteuse seervorming in die mond. Kan

ook gebruik word as behandeling van afteuse seervorming as komplikasie by siektes soos spru, idiopatiese steatorree en seervormende dikdermontsteking.

Kan nuttig wees by tandheelkunde, bv. gevoeligheidsreaksie op tandmateriaal, maar nie traumatiese toestande te wyte aan plate wat sleg pas nie. *Corlan* Pellets behoort nie normaalweg gebruik te word by die aanwesigheid van groot besmetting van die mond of vir die behandeling van mondbesmettings soos vrotstraal en angina van Vincent nie, behalwe as 'n hulpmiddel vir spesifieke chemoterapie.

Toediening: 'n Mens moenie *Corlan* Pellets suig nie, maar hulle in die mond hou en stadig laat oplos, baie naby aan die werklike seer of sere.

Dosis: *Ligte Afteuse Seervorming*: Een korrel vier keer per dag.

Swaar Afteuse Seervorming: Aanvanklik, soos vir ligte seervorming. Daarna moet 'n mens aanhou met 'n onderhoudsdosis van een of twee korrels per dag in matig ernstige gevalle of drie tot vier korrels per dag in die strafste gevalle. As die aangetaste deel 'n paar maande heeltemal gesond bly, kan terapie gestaak word, maar moet by die eerste teken van 'n nuwe aanval hervat word.

Berging: Bêre op 'n koel, droë plek.

Verwysing: Truelove, S. C. en Morris-Owen, R. M. *Brit. Med. J.*, 1958, *i*, 603.

Glaxo Laboratories (S.A.) (Pty.) Ltd., Manchesterweg, Wadeville, Transvaal.

KANTREX

(KANAMISIENSULFAAT)

Beskrywing: *Kantrex* is 'n nuwe antibioticum verkry van *Streptomyces kanamyceticus*. Dit het 'n bakterievernietigende effek op 'n groot verskeidenheid van Gram-positiewe en Gram-negatiewe patogene, insluitende talle weerstandskragtige soorte *Micrococcus pyogenes* var. *aureus*.

Indikasies: Soos in die geval van ander antibiotica kan addisionele mediese of chirurgiese versorging noodsaaklik gemaak word deur die gevoeligheid van die organisme vir die middel, die duur en omvang van die infeksie vóór die aanvang van behandeling, en die aanwesigheid van verwante anatomiese of fisiologiese abnormaliteite.

Die indikasies vir die gebruik van *Kantrex* sluit in infeksies wat veroorsaak word deur kanamisiengevoelige organismes, veral die soorte wat weerstandskragtig teen ander antibiotica is.

Asemhalingsinfeksies: Lugpypontsteking, brongitis, longontsteking, bronchopneumonie, longabsesse, borsvliesontsteking, empieem en lugpypverwyding.

Urienstelsel-Infeksies: Akute en chroniese nier- en nierbekkenontsteking, blaasontsteking.

Infeksies van die Sagte Weefsels: Wondinfeksies, absesse, weefselontsteking.

Infeksies van die Bloedstroom:

Beenmurgontsteking:

Dosis: *Volwassenes*: Gemiddelde daaglikse binnespierse dosis van 1 tot 2 g. in 2 tot 4 gelyk verdeelde dosisse.

Kinders: Gemiddelde daaglikse binnespierse dosis van 15 tot 30 mg. per kg., in 2 tot 4 gelyk verdeelde dosisse.

Voorsorgsmaatreëls: In die loop van uitgebreide kliniese proefnemings is tekens van nierprikkeling en huiduitslag (wat met die staking van die terapie verdwyn het) af en toe opgemerk. Tekens van disfunksie van die agste senuwee—gesuis, duiseligheid en gehoorverlies—is by 'n paar pasiënte waargeneem. Hierdie pasiënte was meestal bo 45 jaar; almal het 18 g. of meer *Kantrex* ontvang. In laasgenoemde opsig skyn dit asof *Kantrex* 'n kleiner toksiese potensialiteit as streptomisien het.

Beskikbaarstelling: *Kantrex* word beskikbaar gestel in flessies met 'n rubberproppie as 'n steriele waterige oplossing wat gereed vir gebruik is. Daar is twee konsentrasies:

Kantrex (kanamisiensulfaat) 0.5 g. in 2 ml. volume.

Kantrex (kanamisiensulfaat) 1.0 g. in 3 ml. volume.

BOOK REVIEW

EXPERIMENTAL SURGICAL STUDIES

An Introduction to Experimental Surgical Studies. By W. J. Dempster, F.R.C.S. 1957. (Pp. 450 + Index. With 72 Figs. 50s.). Oxford: Blackwell Scientific Publications.

No one whose work is in any way related to experimental surgery, be he student, physician, physiologist, surgeon or experimental surgeon, should be without this book.

It is beautifully produced, well written, adequately illustrated and encompasses almost every known field of experimental endeavour covering elementary basic work from topics such as tissue regeneration and skin healing to low temperature studies. Its greatest strength, however, lies in its fantastically up-to-date and comprehensive bibliography. This itself should prove a great boon to all whose work even remotely fringes on this brave new and exciting field.

A minor disappointment to the reviewer, in this otherwise excellent book, is the fact that only 2

pages of discussion are devoted to heart-lung work. Not only is this inadequate in a recent book, but many of the statements are also certainly not borne out by the experience of those who have worked with these heart-lung machines. For example, the author categorically states that 'coronary sinus blood should not be replaced.' This is certainly not correct.

Although the author takes great care to exclude dogma in his criticism of experimental work, this is not so of his assessment of proven surgical procedures. On page 276, for example, on reviewing *Coronary Insufficiency*, he categorically states: 'None of these measures has been clinically successful.' This is hardly borne out by the large series of successful cases reported upon by Claud Beck and others whose work he quotes. Again, on page 202, discussing the value of homografts as compared to artificial grafts, he states categorically: 'Clinical difficulties have forced surgeons to abandon arteries *altogether* in favour of nylon substitutes.' This surely is an inaccurate assessment of the large number of cases reported where homografts have been so successfully used. To-day so much clinical work is based on experimental studies that this book should be available for reference by all those who wish to apply these new methods with critical appraisal.

It can be very heartily recommended on these grounds. It also makes very easy reading.

CORRESPONDENCE

SERUM LIPIDS AND CORONARY DISEASE

To the Editor: In *Medical Proceedings* of 28 June 1958, there appears a most informative article by Bloomberg *et al.* on serum lipids and coronary disease. They conclude that 'when compared with the urban Bantu group, all the normocholosteraemic White subjects in this study may be considered abnormal.' But they go on to say that 'these findings emphasize that the clinician is unlikely to be assisted by the serum lipids in his problem of anticipating attacks of coronary thrombosis. . . .'

I maintain that the clinician is so assisted in that the whole White population is at risk, when one considers that as many as one in four may be carried off by coronary disease. This concept is in keeping with Bloomberg's statement that the whole White population may be considered abnormal, and adds enormous weight to the dietary theory in this disease. I submit that from a clinical viewpoint a serum cholesterol above 200 mg. per 100 c.c. should be treated by dietary means, although there are odd cases (very few) in which infarction or angina may occur with serum cholesterol near the 'ideal' of 150 mg. per 100 c.c.

Roy Morris, M.D., M.R.C.P.E.

3rd Floor, Clarendon Centre,
4 Park Lane,
(off Clarendon Circle),
Parktown,
Johannesburg.

APPEAL FOR EMBRYOLOGICAL MATERIAL

To the Editor: I would be grateful if I may be permitted to make an appeal to the readers of *Medical Proceedings*. It is essential for our embryology research programme to have available a large number of foetuses and embryos. In the past local medical practitioners have been most co-operative in sending foetuses to me and now I wish to make a special request for young embryos which are particularly required for a project on the investigation of the development of the anal and rectal region. Specimens are easily wrapped in cotton wool soaked in 5% formaldehyde solution and could be put in a small tin which could be sealed with adhesive tape, e.g. an Elastoplast tin, and sent either by surface or air mail.

I would be extremely grateful for such co-operation and would certainly refund postage expenses. It would also be appreciated if a covering note with the possible age of the specimen, and the age and race of the mother could be sent.

It need not be stressed that this type of research is quite impossible without the kind favours of those who are able to supply us with the specimens.

Ronald Singer.

Anatomy Department,
University of Cape Town
Medical School,
Observatory, Cape.

THE SOUTH AFRICAN PAEDIATRIC ASSOCIATION PAEDIATRIC PRIZE ESSAY, 1959

To the Editor: I should like to inform you that the South African Paediatric Association is again offering its annual prize to 5th and 6th year medical students. The details are as follows:

'The Etiology of Gastro-Enteritis in Infants.'

Entry is open to all 5th and 6th year medical students in South Africa. The Essay must be limited to 5,000 words, may be in English or Afrikaans and must be typed in double spacing together with a copy. Entries should be sent to The Secretary, 201, Medical Centre, Pretoria, before the closing date, 31 March 1959.

The prize is a bronze medal and a cash prize of £10 for the purchase of books, instruments or subscriptions to journals.

The Association reserves the right that if, in any year, there is, in the opinion of the Examiners, no candidate of sufficient merit, there will be no award for that year.

Ellis Fasser,
Honorary Secretary: *Treasurer*.

201, Medical Centre,
319, Pretorius St., Pretoria.